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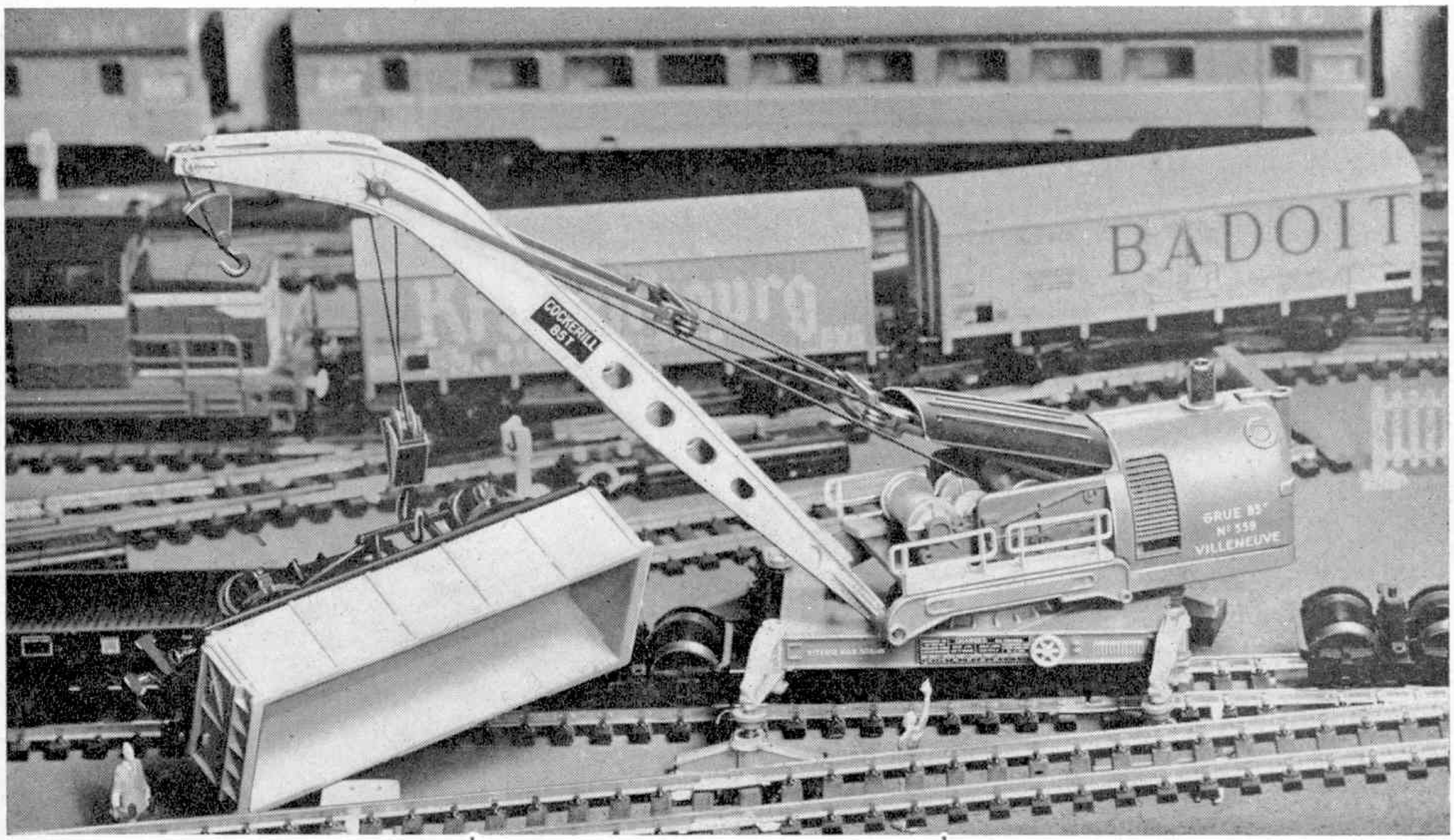

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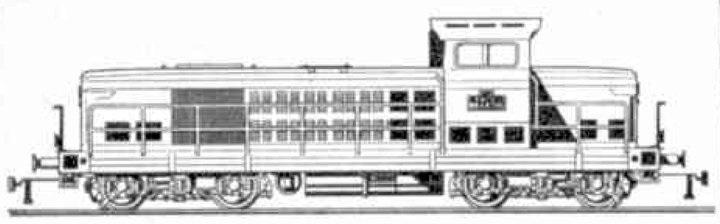

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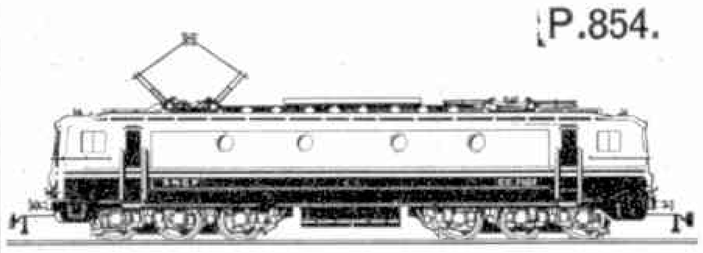

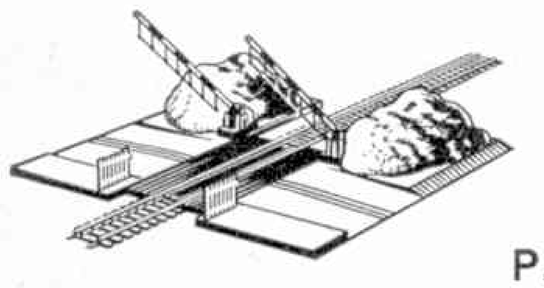

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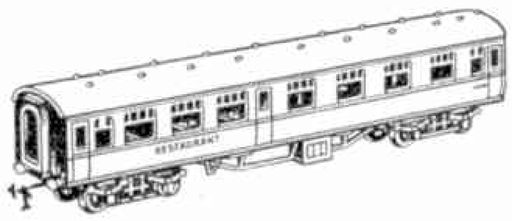

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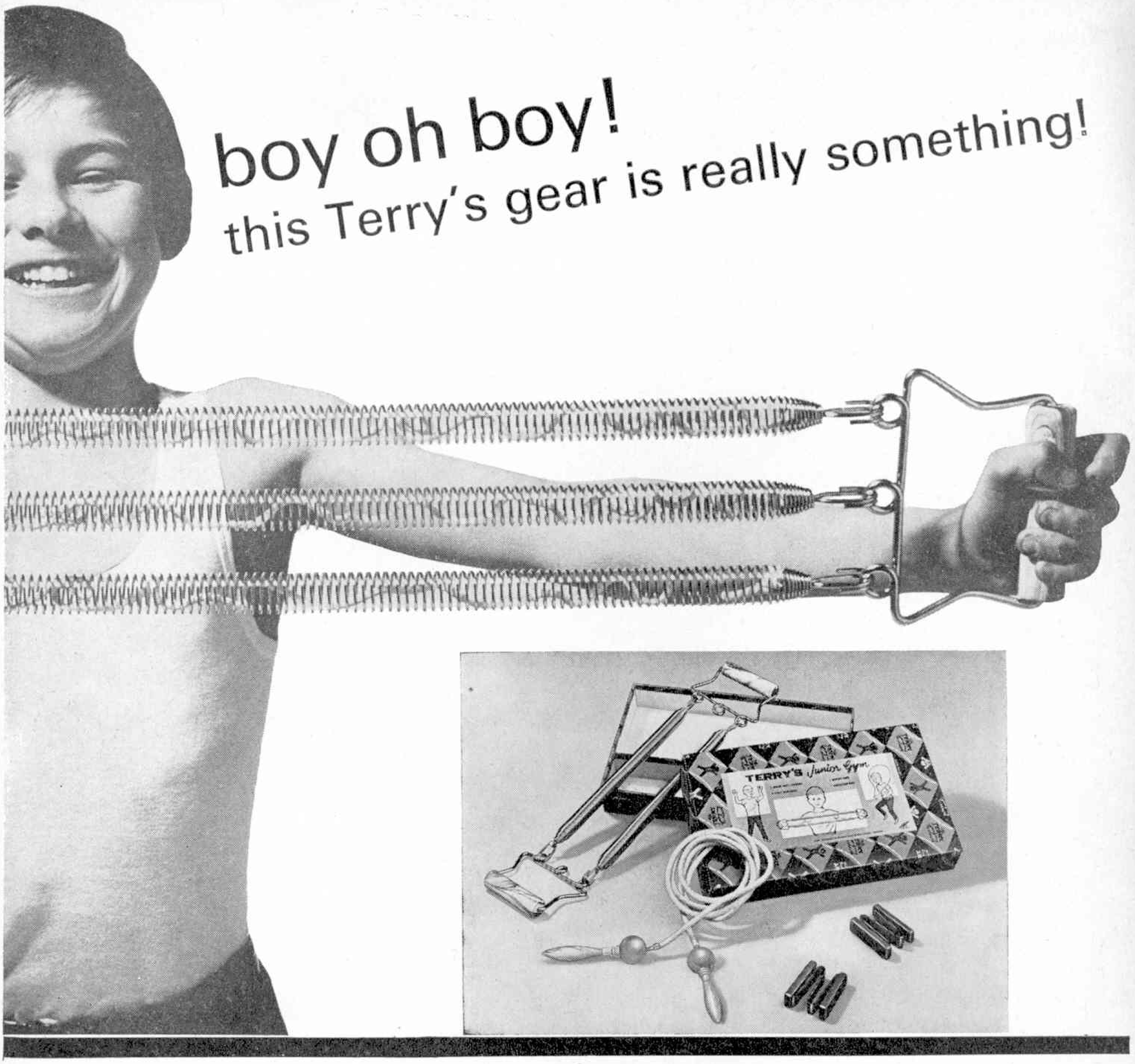

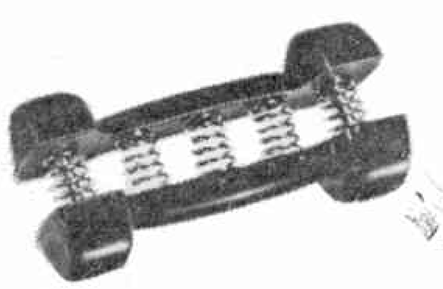

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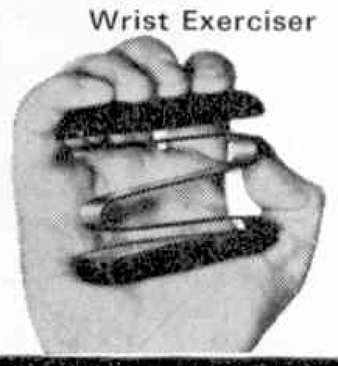

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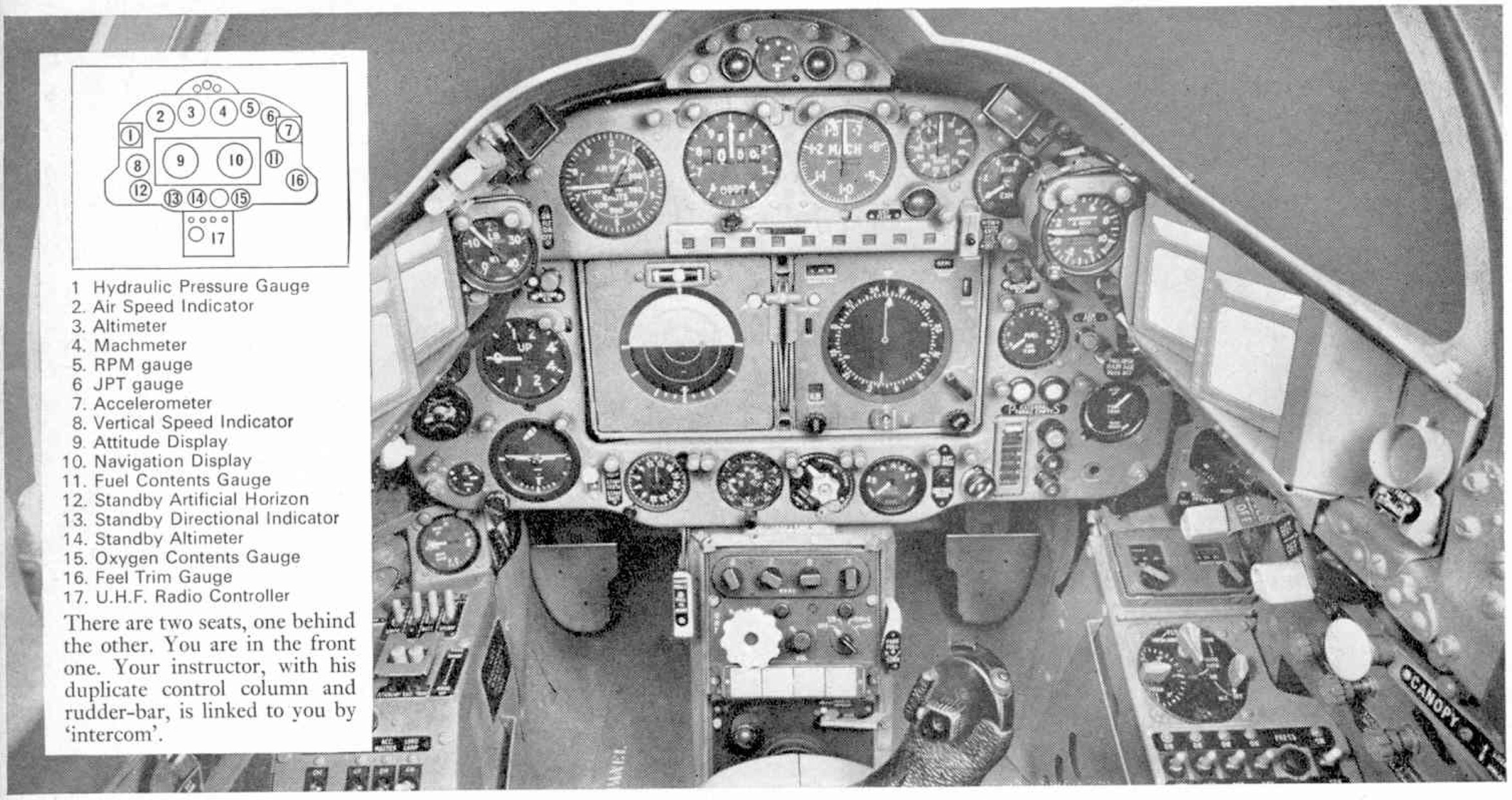

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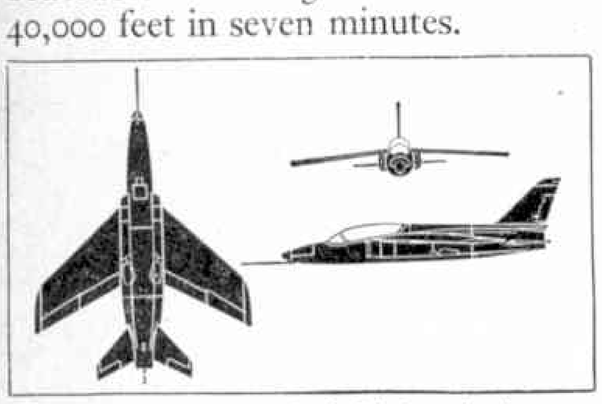
There are two seats, one behind the other. You are in the front one. Your instructor, with his duplicate control column and rudder-bar, is linked to you by 'intercom'.

Pilot's-eye-view of the Gnat

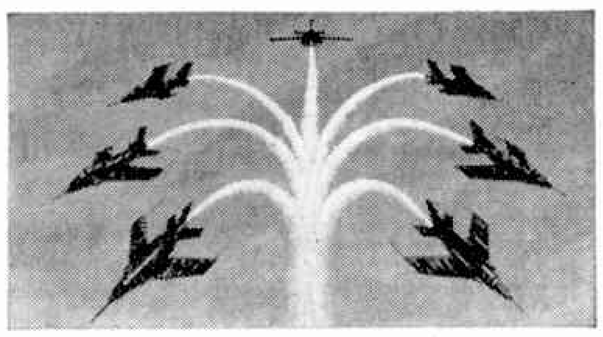
—*advanced jet trainer of the Royal Air Force*

If you are training to be a pilot in the R.A.F., the Hawker Siddeley Gnat T.1 is the third aircraft you will fly. The Gnat is powered by a Bristol Siddeley Orpheus turbojet engine and is extremely manoeuvrable with a high rate of climb—40,000 feet in seven minutes.



All pilots do their initial training on the Chipmunk and Jet Provost. When you go on to the Gnat—after say 14-15 months—you know that you have been selected to fly fighters or bombers, rather than transports. After the Gnat you go to an operational conversion unit where you train on the aircraft you will fly on your first Squadron—Lightnings, V-bombers, Phantoms, P1127's or F111K's.

You may have seen the Gnat flying. The R.A.F.'s aerobatic team for 1966, the Red Arrows, consisted of Gnats, flown in formation by some of the R.A.F.'s top pilots. They gave flying displays all over the country—in Europe and America—'showing the flag' for British aircraft, British aviation, and the R.A.F.



This could be your future. If you are interested in aeroplanes, and flying, and an adventurous life you ought to read the R.A.F. booklet *Aircrew.* The form is that you will need five 'O' levels including English language and mathematics to enter the R.A.F. at 17½, but you can take a test at 16 to see whether you are likely to be accepted. Even if you are younger than 16, don't hesitate to send in the coupon for your free copy of *Aircrew*, giving all the facts.

To Group Captain M. A. D'Arcy, R.A.F., Adastral House (703JC1), London, WC1.
Please send me your free booklet ***Aircrew.***

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The Royal Air Force

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Profusely illustrated

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The year 1955 saw the beginning of the end of steam on the railways of Great Britain. From that year, no new designs were built and the steam locomotive began to disappear with increasing momentum from the land of its birth. In this book, P. Ransome-Wallis, author of many books on railway subjects, presents a well-illustrated survey of those locomotives which were operating British Railways' trains during the final years of steam. A concise history and description of each class is given in the captions, and a table of dimensions, together with an informative appendix on steam locomotive classification, help to make this book a valuable work of reference for the specialist as well as a source of nostalgic pleasure for all who have loved steam and are sad at its passing.

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THE MODEL WORLD AT YOUR FINGERTIPS

MECCANO MAGAZINE

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MARCH 1967 VOLUME 52 No. 3

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ON THE COVER: A Chieftain, latest British battle tank, operating on the tank-training area at Bovington Camp, Dorset. The trainee driver is from the 11th Hussars who are at present receiving the first Chieftains' in Germany.

Photo: courtesy of *Soldier*, the British Army Magazine.

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Meccano Magazine has always been a book preserved by its readers long beyond its cover date. I still receive letters from people who have copies dating back to the Roaring Twenties and I'm sure that lots of today's readers will be equally preservation-minded. This is not merely wishful thinking, for the number of M.M. Easibinders sold continues to increase at a steady rate and, of course, a number of readers have their magazines permanently bound at the end of the year, and use the Easibinder again to keep next year's books in good condition. Recently I have had one or two letters telling me that the present size of Easibinder is not large enough to hold twelve of our new, thicker magazines, and I must admit that it can be difficult if the issues are inserted as suggested by the binder manufacturers. However, it is quite possible to accommodate a whole volume if the following procedure is adopted.

Secure the January issue with the thick rod in the centre-spread pages, locating the rod ends in the first circular hole in the binder end clips. February to November issues are inserted using the thin rods supplied, *all* locating in the long slots in the end clips. December is then fixed in the same way as January to complete the job. This system is perfectly satisfactory in use; my own reference issues are fixed in this way, and on the bookshelf the 1966 volume occupies only the same space as the earlier ones, despite the larger number of pages. I hope soon to be able to make an announcement about the availability of an enlarged binder for the benefit of those who don't mind a slightly bulkier volume. It will, however, probably cost a little more than the very economical 10/– charged for the present size—more detailed information soon.

Letters still arrive at our office from time to time from readers who have built our M.M. Electronic Organ which was described in the July, August, September and October issues last year. Many of you have successfully enlarged on the basic design, by incorporating 'sharps and flats' and both treble and base keyboards. But the prize for ingenuity really goes to a reader who wrote to us recently; he has built a mechanism from Meccano and Electrikit parts which actually *plays* the organ automatically! A programming tape provides the 'brains' of the machine, and apparently it works very well indeed. Well done!

Visitors to our stand at the 1967 Schoolboys and Girls Exhibition were invited to enter for a simple competition the prizes for which were three flying model 'Stardusters' built by the designer of the model, the plans for which appeared in our January issue.

The three lucky winners are, Phillip J. Hurrell of Edgeware, Middlesex. Alan K. Morgan of Addlestone, Surrey. Raymond Jennings of London.

Last month's announcement of the Frog lifeboat constructional feature which was to have appeared in this issue was, I fear, a little premature! The kit will not now be in the shops for some weeks and so we have held over our article until it is generally available. The latest Frog aircraft kit—a 1/72 scale Hawker Hurricane is featured this month in place of the lifeboat.

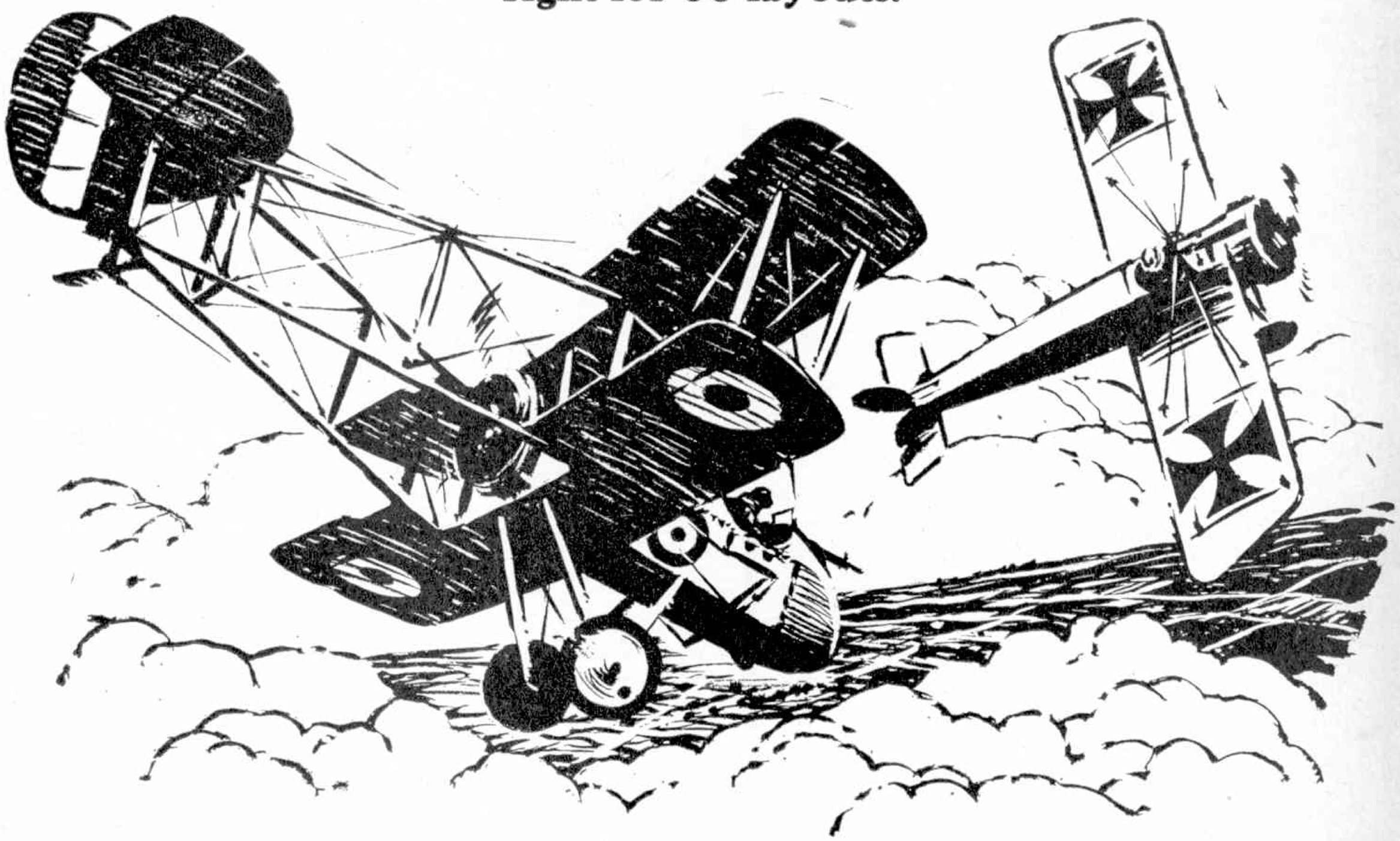
Overseas Winners of Competition 'P' Holden Sedan Special

Bryan Foster, Molkomsbacken, Farsta, Sweden. Stefan Hellwig, Kim Street, Sarnia, Ontario, Canada. P. Jordaan, Bishop's Hostel, Kimberley, Cape Province, South Africa. Lorenzo Raffo, Viale Lexert, Aosta, Italy. Theisen Robert, rue, Marechal Foch, Virton, Province de Luxembourg, Belgique.

Next Month: Model farmhouses from our airfield construction series, Part II of which appears in the April issue. Start to build our Meccano Magazine Computer. With it you will be able to add up and subtract at a lightning rate and multiply and divide only a little more slowly. This much-requested series of features will take you stage-by-stage through all the constructional steps. Don't miss the start of this great feature, the April issue will be much in demand—order your copy now!

Home of the fighting scouts

It goes without saying that aeroplanes need airfields—all, that is, except the new VTO jobs and helicopters—but how many of the millions of plastic model planes built every year find their way to their own miniature airfields? Today, it needs years of legal wrangling and yet more years of heavy engineering to construct an airfield for modern jets to use. Not so in the early days of flying when almost any suitably sized flat field was a potential air base and the only legal negotiations were with the farmer who owned it! Such fields were commonplace in France during the 1914-18 war and author-artist-modeller, Ken McDonough, has made a special study of this pioneer period. This month, he begins a new and unique series of features in which he will describe the building of his own magnificent 1/72 scale World War I Royal Flying Corps field, and at the same time tell the fascinating story of the real-life airfields of 50 years ago. Here, at last, is a real base for your homeless plastic models! Many of the scenic techniques will be equally useful to the railway modeller and, of course, the scale of our model is just about right for 00 layouts.



Building a model of a Royal Flying Corps Aerodrome

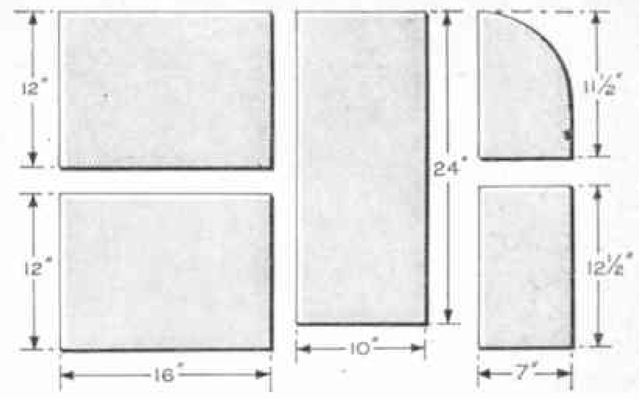
DURING the Battle of the Somme, 1916, The Royal Flying Corps maintained an almost uninterrupted ascendancy over the German Air Force. When battle was joined on July 1st, 27 squadrons were in the field with a total strength of 421 aeroplanes. The supremacy of the R.F.C. was in large measure due to the D.H.2 Scout, a small pusher biplane with an unobstructed field of fire for the Single Lewis gun in the nose.

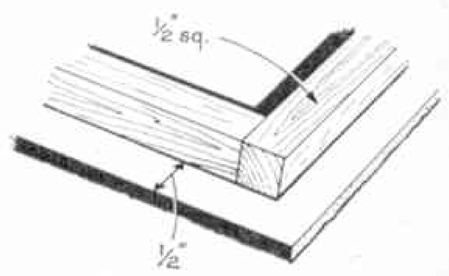
At the commencement of the Somme battle the R.F.C. was operating from 25 aerodromes in the neighbourhood of the towns Amiens, Arras and Doullens. The first squadron ever to be equipped with single seater Scouts was based at Bertangles, near Amiens, under the command of Major L. G. Hawker, V.C., D.S.O.

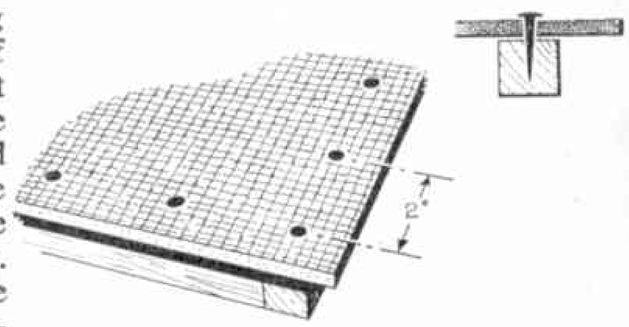
Unless used by more than one squadron, aerodromes during the First World War were much smaller than those of today. Any field or flat piece of land about three hundred yards square near a road was usually sufficient. Specially constructed runways were not required as the take-off and landing-run of the lightly loaded aeroplanes was fractional compared with modern jet aircraft. Most of the aerodromes were on the outskirts of a village. Nearly all the adjacent land was under cultivation and, once a suitable site had been chosen, an amicable agreement was usually reached between the landowner and the military authorities. A fixed rent with an additional percentage for depreciation was then established. Sometimes partial use of the land was still allowed for grazing and it was not uncommon for cattle to stray on to an aerodrome when the occupying squadron was fully operational. During the first two years of hostilities the housing of aerodromes was primitive by present day standards. Permanent wood and brick structures and the familiar French Bessoneau hangars only became common during the later stages of the war. A type of hangar widely used by the R.F.C., as featured in our model landscape, was the R.E.7 portable. This was really a large canvas marquee tent, open along one side and braced by guy-ropes. Originally designed to accommodate one R.E.7 bomber, this hangar was soon issued to squadrons equipped with other types of aeroplanes when the R.E.7 became obsolete. It was large enough to house three single seaters, but even so, three hangars could be packed on a standard Army lorry. Over six hundred were still in use at the time of the Armistice.

Many of the houses and farm buildings in the villages from which the R.F.C. squadrons operated are still standing today. As squadrons were almost invariably based several miles from the front line, buildings in the vicinity were not subjected to the ravages of war. The Somme area today, still presents an aspect similar to that of fifty years ago.

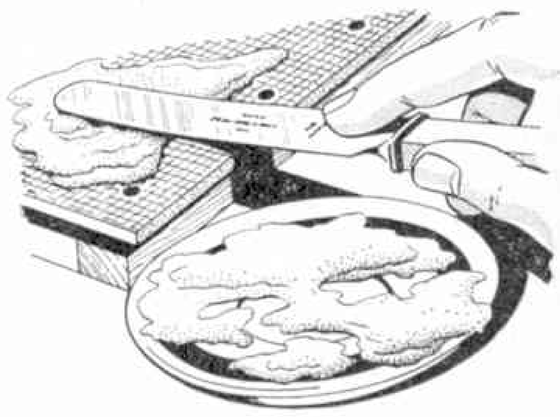
Our model represents part of a typical aerodrome of that period and is easily constructed from materials which can be bought for a few shillings. The aeroplanes are made from Revell Kits of the D.H.2 and Morane Saulnier N and the figures and livestock are from the Airfix and Merit ranges. Naturally your model aerodrome could be considerably larger than ours. The one in the photograph measures 3 ft. by 2 ft., so you can easily imagine how much space would be required for a complete 1/72 scale aerodrome for a squadron of fighters. Buildings are constructed of thin card and balsa wood and the portable hangar can be made for the price of a khaki handkerchief and a length of $\frac{1}{8}$ in. square balsa. Cart wheels for the farm vehicles come from parts in the Airfix kit of Stephenson's 'Rocket' locomotive (alternatively, Slater's cart wheels can be used if locally available). To commence construction you will need five baseboards, cut from hardboard, to the dimensions given in the sketches. Hardboard has a tendency to warp and each section must be suitably stiffened with $\frac{1}{2}$ in. square wood. The rough side of the hardboard should be uppermost. When the baseboards have been cut, go round the edges with a file so that each one fits up closely to the next. It is important that no gap appears between each section as this would destroy the illusion of a continuous stretch of ground. The $\frac{1}{2}$ in. square hardwood used to stiffen each section can be bought from any 'Do-It-Yourself' store, and four 6 ft. lengths will be required. The hardwood lengths should be attached $\frac{1}{2}$ in. in from the edges of each baseboard and located with a suitable P.V.A. white adhesive such as Evo-Stick Resin 'W' before permanent fixture with carpet tacks driven in from the hardboard side at 3 in. intervals. These tacks are covered with Polyfilla surfacing, so are invisible in the finished model. Three of these baseboards should now be surfaced with Polyfilla; the ones for the hangar, the section in front of hangar and road. Apply evenly all over each section with a table knife, working the Polyfilla well into the grain of the hardboard. It is important that this grain is concealed so the second layer can now be applied while the first is still wet, more unevenly this time to represent the irregularities in the ground surface. In the road section, cart ruts can be represented by scoring the wet Polyfilla with a pencil point.



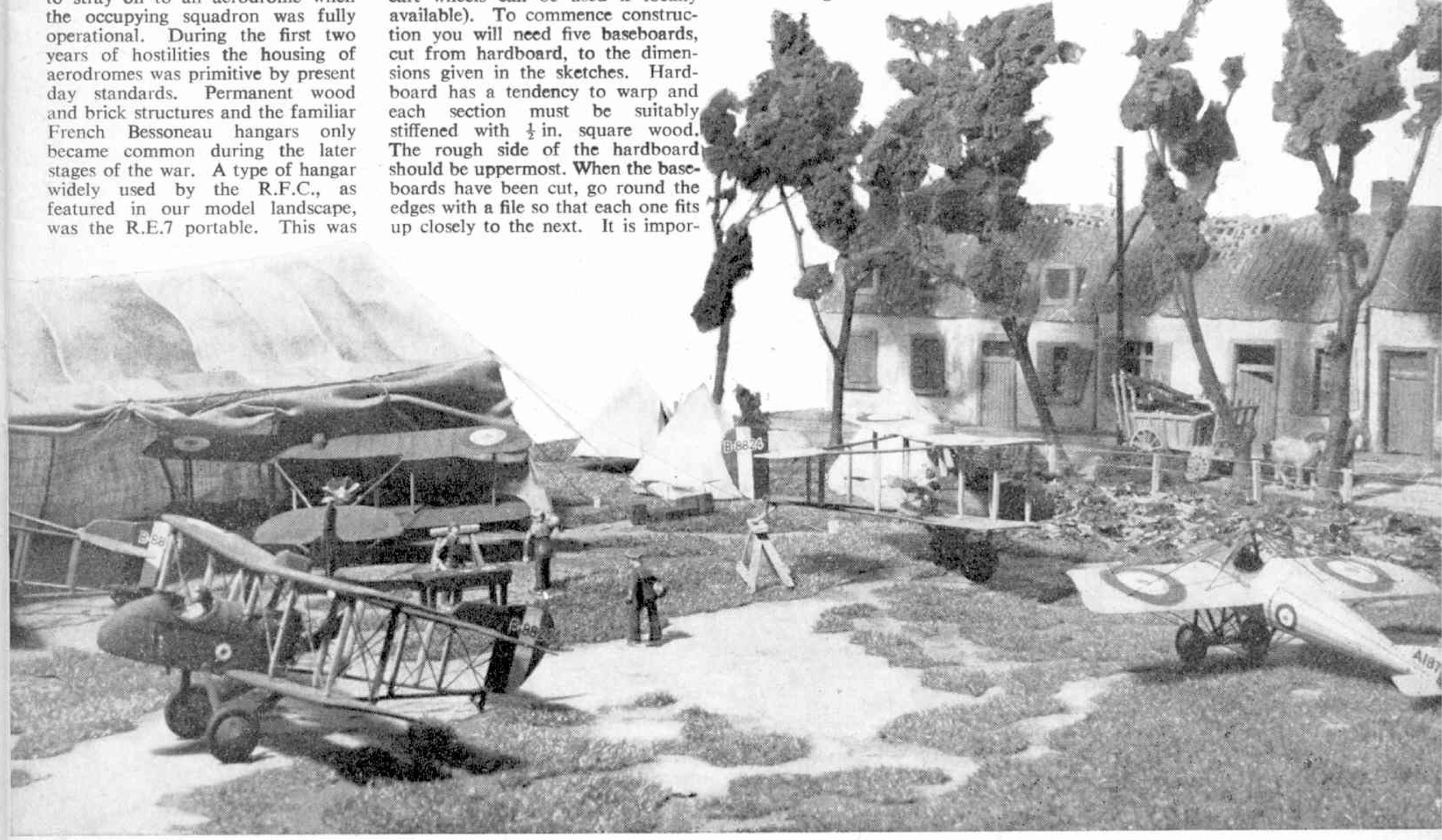




When surfacing the baseboards, try to avoid a 'palette knife' effect. Tap the Polyfilla into place here and there to vary the texture. Most aerodromes were covered by short grass or stubble, the area in front of hangars being usually muddy and bare of vegetation. Poster colours are ideal for painting your baseboards, but always remember to keep your colours subdued, as crude colouring can do more to destroy realism than anything else.



Next month we start to construct the buildings.



The Editor looks at some

MANCHESTER MARVELS

Every December the Manchester Model Railway Society presents its Christmas exhibition and it has become something of an annual reunion for thousands of model railway enthusiasts from all parts who gather together to discuss their latest masterpieces and gaze with critical, but appreciative eye, upon the year's handiwork of their fellow railway modellers. Hundreds of wonderful models are to be seen there, both working and static, big and small and from live steam layouts to tramcars. For our two exhibition picture-pages we have concentrated on three intriguing miniature exhibits, each of which was in continuous operation throughout the show. Each in its own way was a masterpiece of ingenuity and imagination. It is from a study of such achievements that the exhibition visitor comes away 're-charged' and determined to use some of the newly acquired ideas on his own layout.

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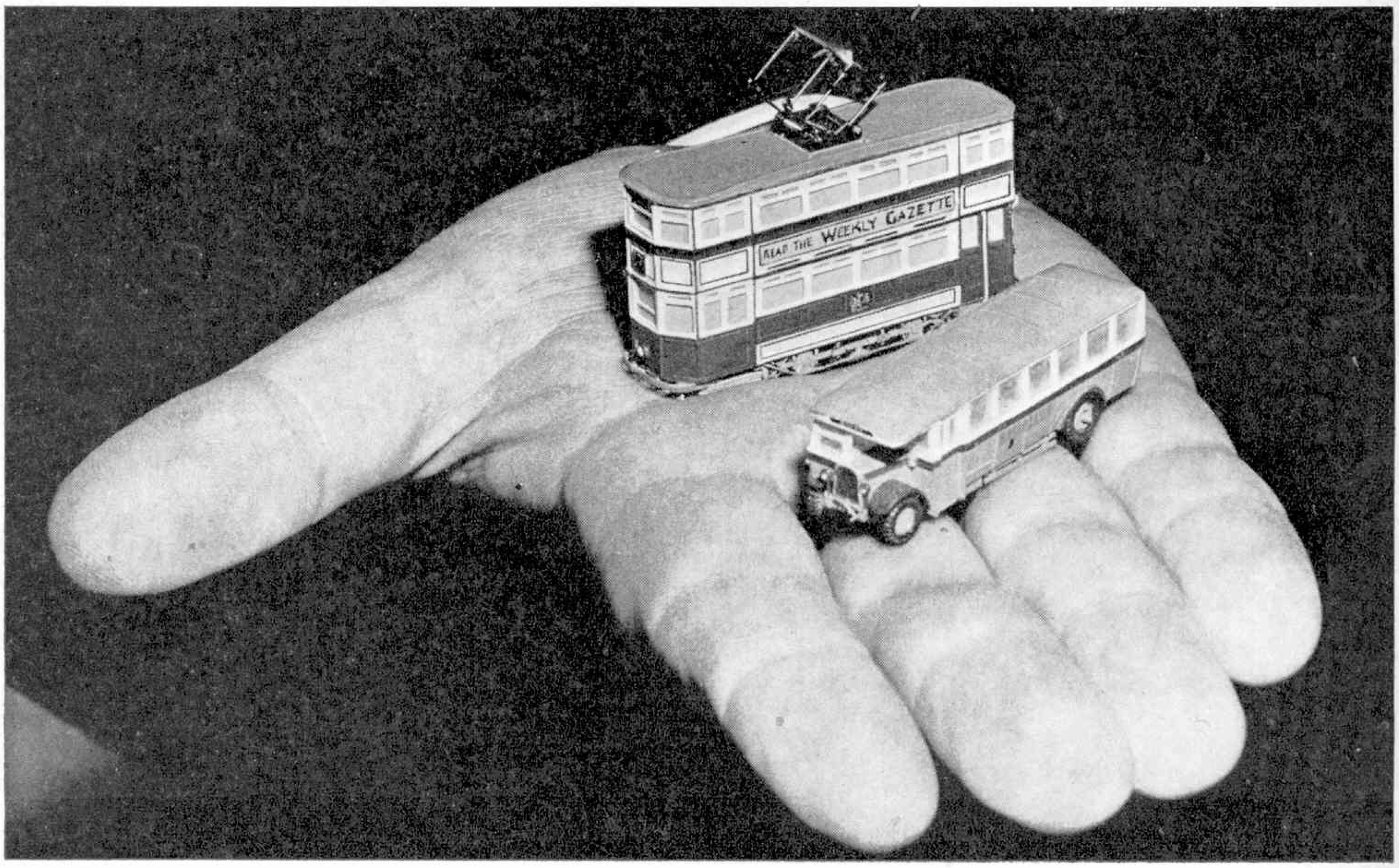

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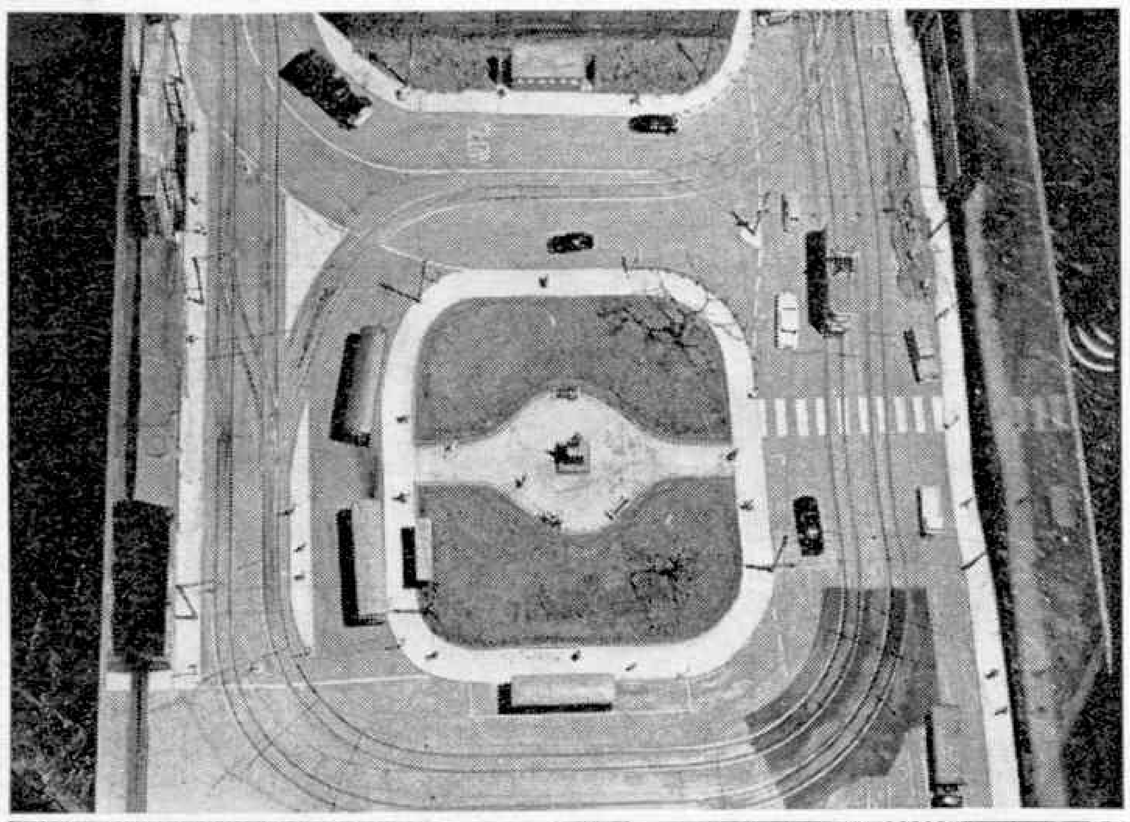

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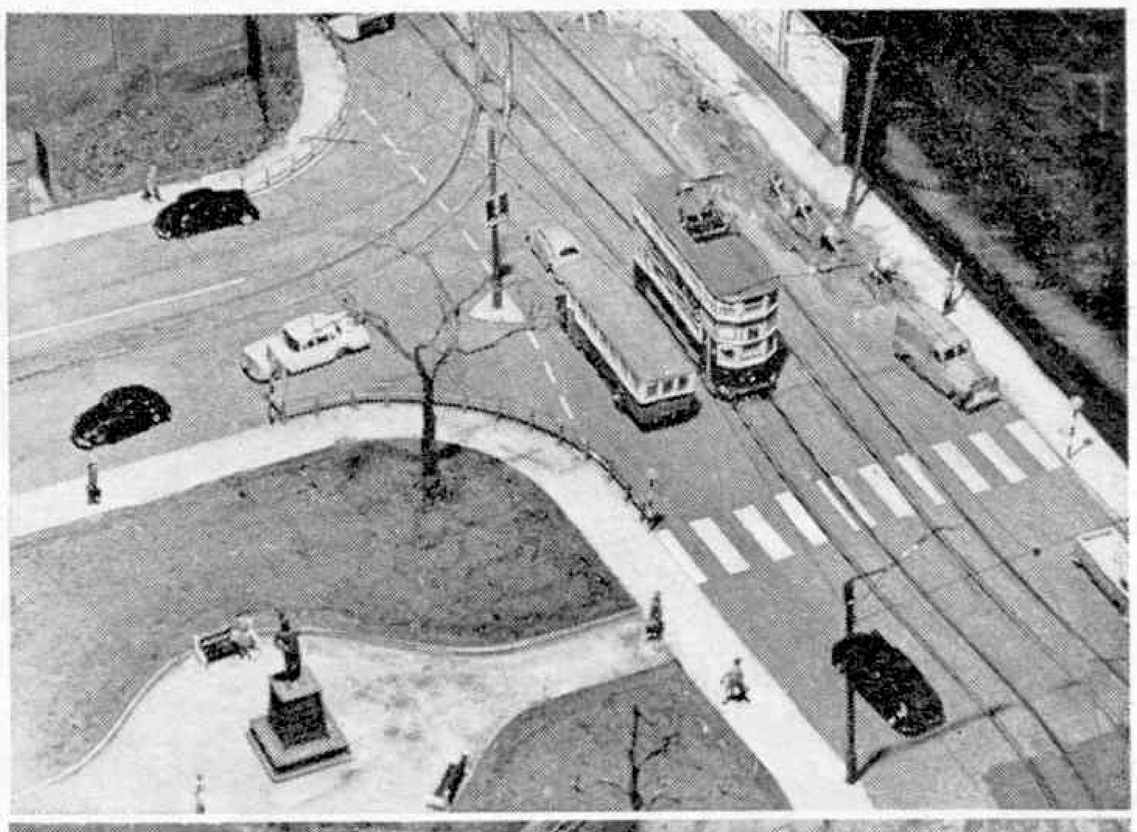

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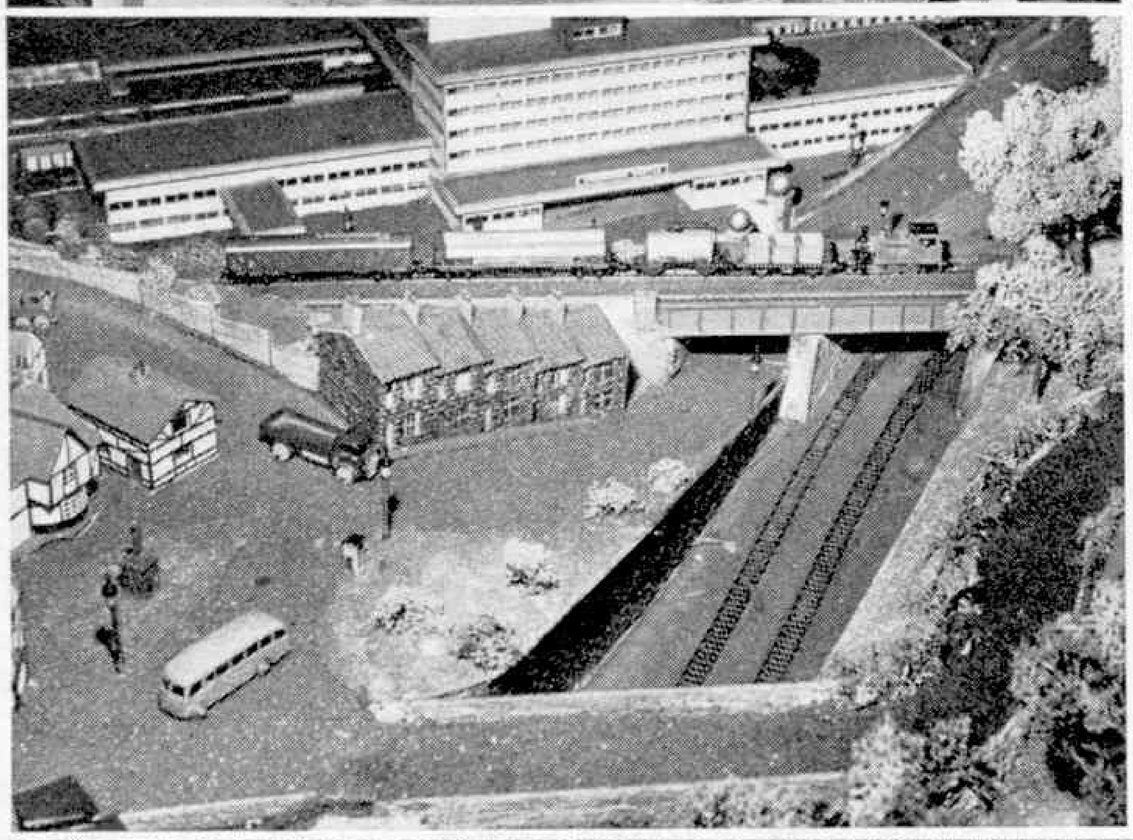

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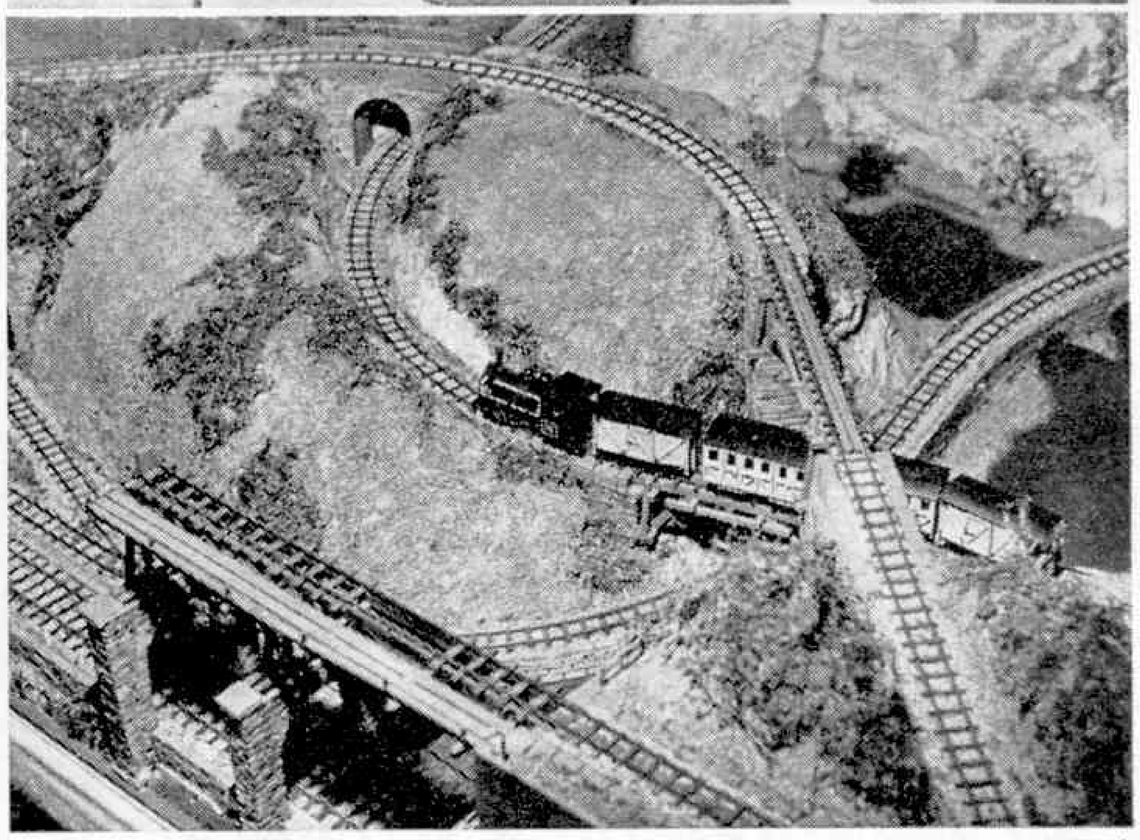

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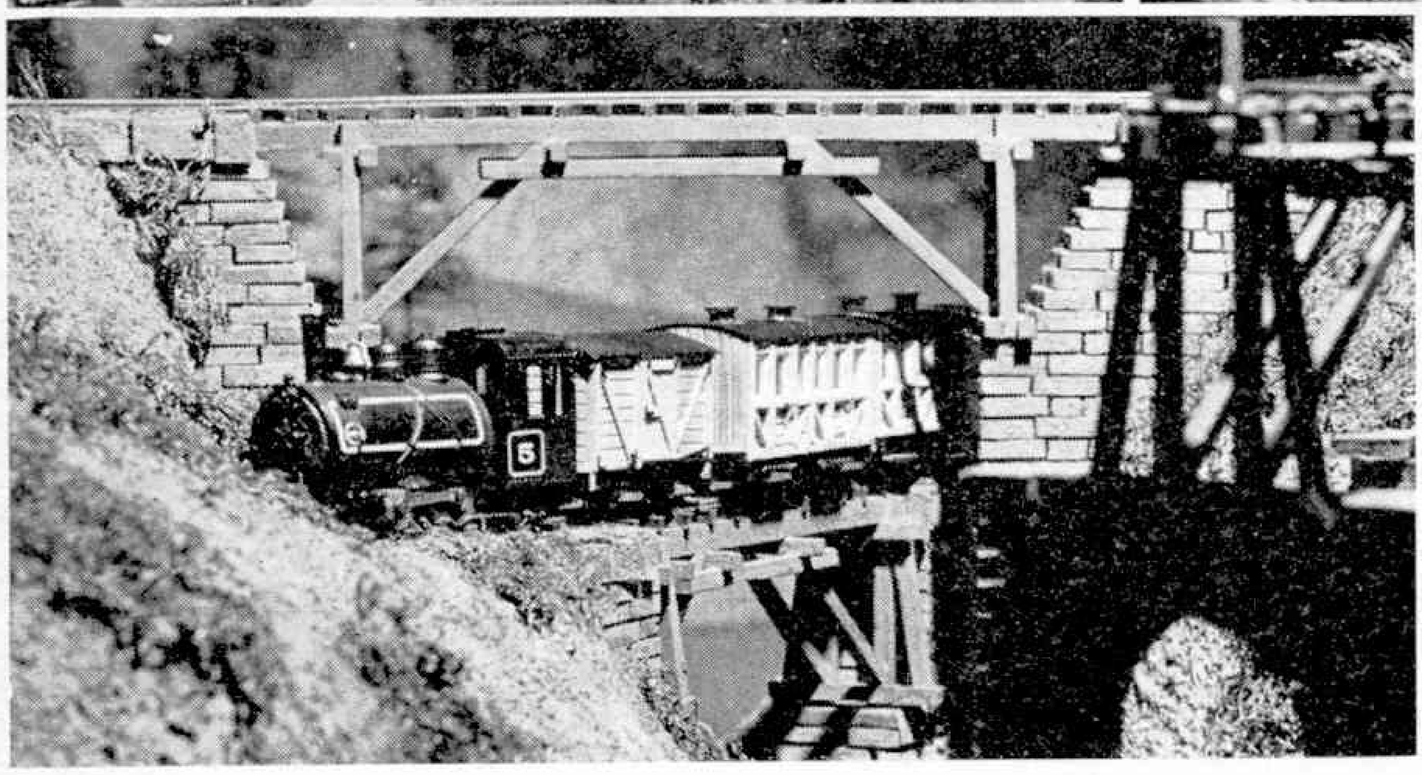

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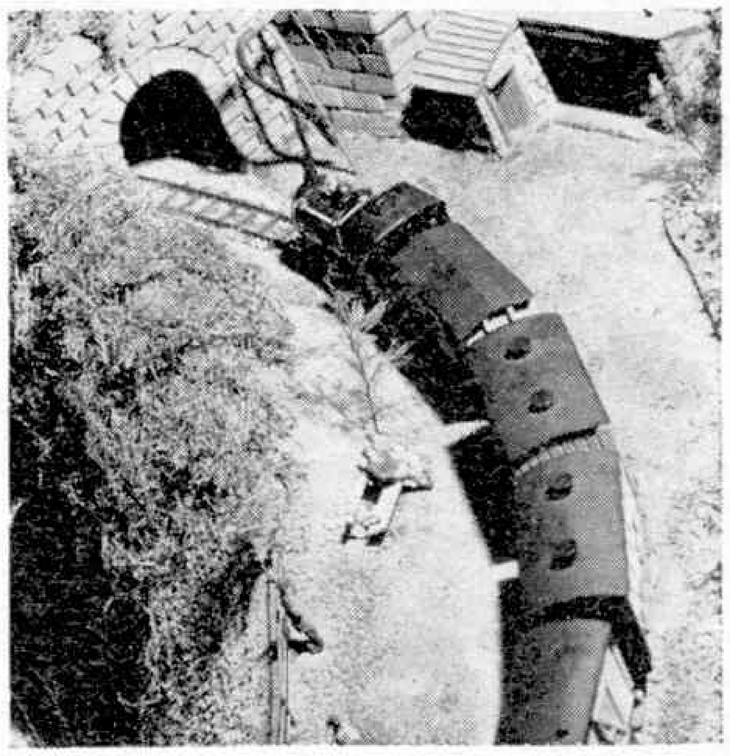


Photo 1. These two little N gauge (2 mm. scale) models are superb examples of Plastikard construction. The bus is a static model and captures in its minute detail the true atmosphere of the pre-war era. The tramcar is a real working model! It employs an N gauge Arnold 0-6-0 locomotive chassis with the central pair of wheels removed, and that pantograph on the roof really **does** collect from the phosphor-bronze overhead wire. It runs on the twin track rectangular layout shown in plan view in **Photo 2** and the whole thing measures only 28 in. by 18 in.! It took about ten weeks to build and the little trams ran with great smoothness and precision during the whole exhibition.

Photo 3 gives a good idea of the attention to detail that went into this model. Look at the road works and the monument in the town square. Builder Tony Parkinson of Lancaster earns our unbounded admiration.

Photo 4 illustrates a small section of the Gransmoor Castle N gauge layout. This is a fine example of co-operation effort, a team of 12 being involved in the construction headed by M. J. Edgar. Note particularly the simple, but effective buildings and the realistic group of five terraced houses on the steep road down to the bridge.

The layout, as seen at this exhibition, is 6 ft. 9 in. by 4 ft. 3 in. and is based on a through main line station. Although it is single line throughout, it gives the illusion of being double tracked, but in fact the trains run in one direction only. All movements are automatically controlled by a bank of relays hidden beneath the scenery.

At present all the rolling stock is of Continental proprietory origin, but it is hoped that as time goes on scratch-built models will be added.

The eventual plan will include a British section and a Continental section linked by the Channel Tunnel. These arrangements will enable the running of both English and Continental trains.

Although the present layout is within a comparatively small area, up to nine trains can be run at any one time, each taking approximately three minutes to complete the circuit.

Photo 5. Mr. George Grainger of the Macclesfield Model Railway Group is the builder of this picturesque narrow gauge line which twists and turns, climbs and tunnels through some most effective scenic work. The 'stone built" tunnel mouths and bridge columns are constructed in scale manner—each individual stone being, in fact, a separate piece of balsa! The effort of building structures in this manner is fully justified by the realistic results and a mere 6 ft. 3 in. by 3 ft. board is all the space this unique line requires! In **Photo 6** a passenger train crosses the lower level of the double bridge, and **Photo 7** shows the same train at the high level 'station' just before entering the tunnel.

DORNIER WITH A DIFFERENCE

by John W R Taylor

When the prototype Do 27 made its first flight, just over ten years ago, it was clearly a Dornier with a difference. Before and during the war, most of the aircraft with a "D" prefix had been multi-engined bombers and flying-boats designed to carry the biggest possible payload as far or as fast as possible. The new Do 27 had only a single engine and was built with the emphasis on short take-off and landing (STOL) performance. Also, unlike its predecessors, it was of Spanish rather than German origin.

TO discover why, we must go back to 1945, the year in which the Second World War ended. Almost all of the Dornier company's factories had been destroyed by British and American bombing raids. The remains of those in West Germany were dismantled; their equipment was removed and surviving aircraft were either broken up or taken over by the Allies for examination and flight testing. Branch factories in East Germany were lost completely. Not that any of this really mattered, as all work on aeroplanes in Germany was forbidden.

Dr. Claude Dornier, founder of the company, then in his 62nd year, had been through all this before. To get round a similar ban after the First World War, he had set up factories in Switzerland and Italy. He believed it would be possible to do the same again, but decided first to try something entirely different. So, in 1950, he formed Lindauer Dornier GmbH to manufacture machinery for the textile industry.

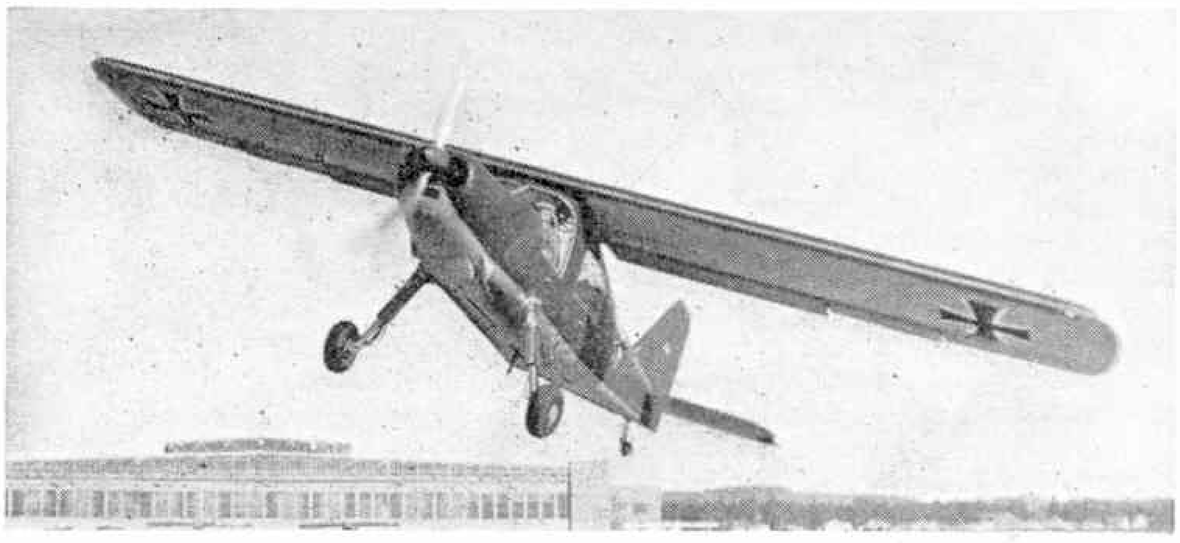
The new company was a success from the start; but Dr. Dornier could not stay out of aviation for long and in February 1951 a design office was opened in Madrid, Spain, under the name 'Oficinas Técnicas Dornier'.

Led by Dr. Dornier's eldest son, the design team began by trying to meet a Spanish Air Force requirement for a light general-purpose aircraft that could be flown from small, rough airfields. The result looked so promising that the Spanish Ministry of Aviation ordered prototypes of the design, which was known as the Do 25.

In general layout, the aircraft was rather like the old wartime Fieseler Storch, which could be landed almost anywhere and performed incredible feats, including the rescue of Mussolini from a small mountain resort in central Italy where he was being held in custody in 1943. But it was far more modern, with a sleek metal-covered fuselage and low-drag cantilever undercarriage. The front part of the wing was also metal-skinned, but the rear portion and all control surfaces were covered with fabric.

To ensure the required STOL performance, the wings had a full-span fixed leading-edge slot and full-span double-slotted trailing-edge flaps and ailerons. The engine was a Spanish-built ENMA Tigre of 150-h.p., supplied with fuel from two 13½-gallon streamlined tanks, carried under the wings. The idea of this was that the tanks could be jettisoned if the aircraft were shot up in action or had to make a forced landing, to reduce the risk of fire.

Absence of wing struts, combined with a huge transparent cockpit cover, gave a superb field of view from both seats on the flight deck. A separate cabin to the rear, with a wide upward-hinged door on each side, was designed to accommodate either passengers or freight.



As the Madrid office was intended only for design work, the prototype Do 25 was built by one of the leading Spanish aircraft manufacturers, CASA. It flew on June 25, 1954, and was followed on June 27, 1955, by an improved version known as the Do 27, with a 225-h.p. Continental 0-470 engine.

The extra power and other improvements gave the Do 27 a spectacular take-off performance and it could not have arrived on the scene at a more opportune moment. The ban on aircraft manufacture in West Germany was lifted in 1955 and the Federal Government ordered the Do 27 into production as the first aircraft of national design to be built in quantity for ten years.

The design team returned from Madrid to the company's old home at Friedrichshafen, on Lake Constance. Construction of the Do 27 was centred in a factory at Neuaubing, near Munich, and the first production machine was flown from nearby Oberpfaffenhofen airfield on October 17, 1956.

Before long, no fewer than seven versions of the aircraft were available to meet varying requirements. Basic model was the Do 27A, with a 270-h.p. Lycoming GO-480 engine, of which 428 had been ordered for the new German Army and *Luftwaffe*. Suitable for observation, liaison, light transport and ambulance duties, it could carry four persons in pairs, facing each other, in the rear cabin. Alternatively, two stretchers could be carried, or a camera, pointing vertically down through a hatch in the floor, for air survey work.

Almost the only obvious change by comparison with the prototype was replacement of the underwing fuel tanks by four conventional tanks in the wings, with a total capacity of 80 gallons. This made room for carrying two droppable supply canisters under the wings, and the versatility of the aircraft was increased further by developing retractable wheel-skis for use in snow-covered areas. A floatplane version (Do 27S) was also flown for the first time in April 1959, but only one was built.

The Do 27B differed from the A only in having dual controls, so that it could be used for training. But the A itself underwent continuous improvement through the years and the final production version, designated Do 27A-4, could be fitted with dual controls as an optional extra; so the B was dropped.

In November 1958, Dornier flew the prototype of the more powerful Do 27H-2, with a 340-h.p. Lycoming GSO - 480 supercharged engine, driving a three-blade propeller instead of the standard two-blader. Easily spotted by its taller curved-top rudder, this version was ordered for the Swiss Air Force, and a total of 13 were eventually built. The other three original versions were all intended for civil use. The Do 27Q-1 was a six-seater, similar to the military 27A; the Q-3, first flown in September 1958, was a four-seater with a 230-h.p. Continental O-470-K engine; and the Q-4 was an improved model of the Q-1, first flown in March 1958.

Later, Dornier replaced these three variants with the Do 27Q-5 which could carry up to six persons in the rear cabin; the Q-5(R) which had only a single seat for the pilot and special equipment for agricultural spraying or dusting; and a version of the Q-5 for the American market, designated Do 27Q-6.

Nor was this by any means the limit of Dornier's ingenuity in "stretching" the airframe. When they wanted to add a twin-engined light transport to their range of products, they simply mounted two 180-h.p. (later 250- and 290-h.p.) engines at the tips of short stub-wings, on each side of the fuselage beneath the pilot's cabin, and replaced the original engine with a streamlined nose fairing. The result was the Do 28, which entered production in 1960.

To flight test their ideas for a vertical take-off and landing (VTOL) aircraft they built the experimental Do 29. Again, this utilised a basic Do 27 airframe, with two 270-h.p. GO-480 engines mounted under the wings, driving tilting pusher propellers. By tilting the propellers downward, incredibly short take-off runs were achieved in perfect safety.

Yet another experimental prototype was the Do 27T-1, adapted by the French Turbomeca company as a flying test-bed for their Astazou II turboprop engine.

Production of the Do 27 came to an end, perhaps only temporarily, after 620 had been built, including 50 manufactured under licence by CASA in Spain, as CASA C.127's. There are no stories of epic flights made by these aircraft, but they continue to serve faithfully and well with military forces all over the world and with civil airlines, carrying passengers to places like Oberammergau, home of the famous Easter play, where there is no airfield for use by less versatile aircraft. One could wish for little more from any aeroplane.

Data (Do 27A-4): Span 39 ft. 4½ in.; length 31 ft. 6 in.; height 9 ft. 2 in.; wing area 208·8 sq. ft.; weight, empty 2,167 lb.; loaded 4,070 lb.; max. speed 141 m.p.h. at 3,000 ft.; economical cruising speed 109 m.p.h.; rate of climb 650 ft./min.; service ceiling 10,825 ft.; take-off run 623 ft; landing run 295 ft.; max. range 685 miles.

Heading opposite: the Do 27 T-1 fitted with a Turbomeca Astazou II turboprop engine

Left: the machine is seen in service with the Luftwaffe sporting its military camouflage

Top: fitted with two engines the machine becomes the Dornier 28. The unique engine mountings are noteworthy

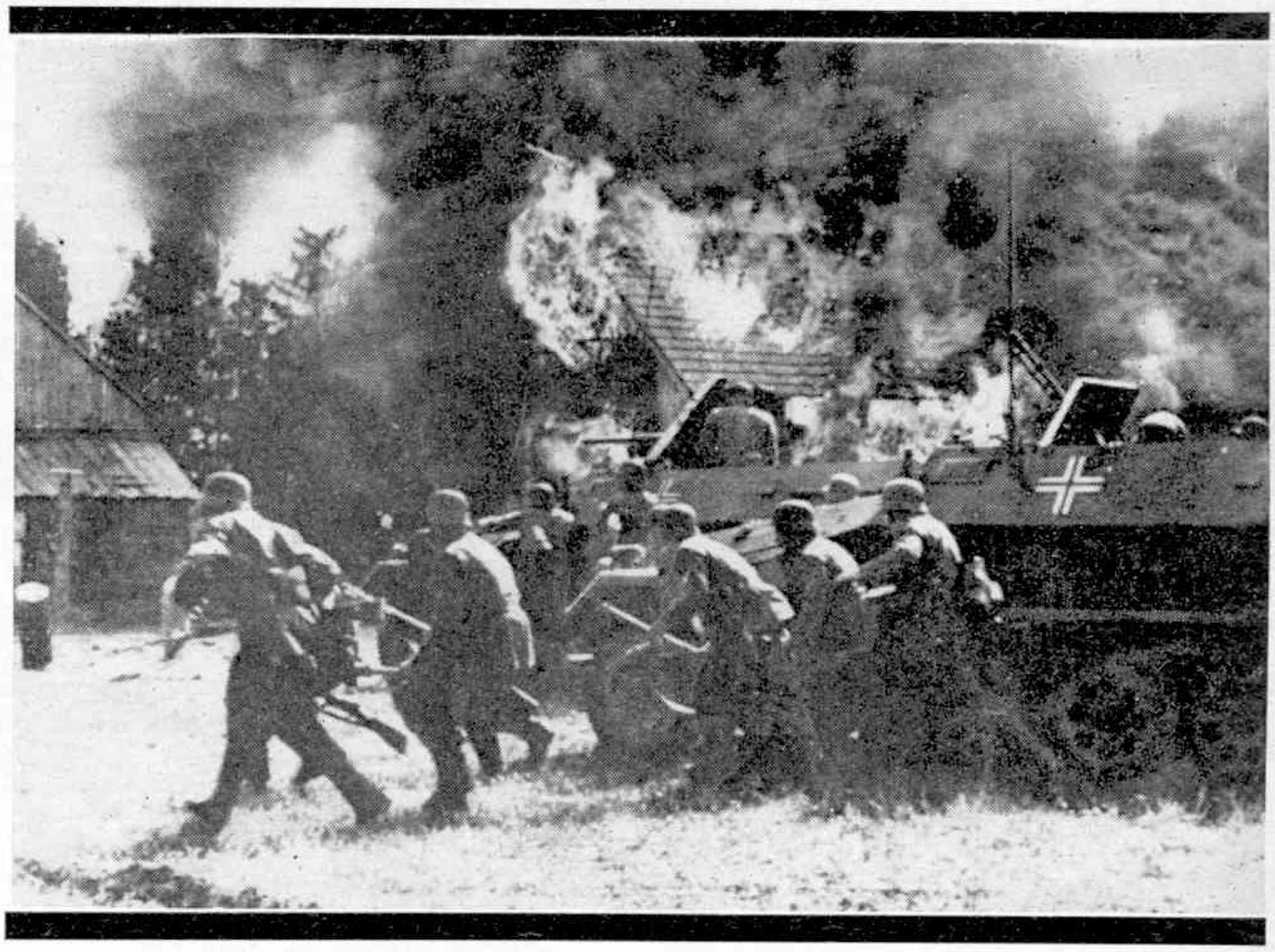
Above left: a fine photograph showing the interior seating arrangements

Centre right: another flying shot of the Do 28, this time with wheel spats removed

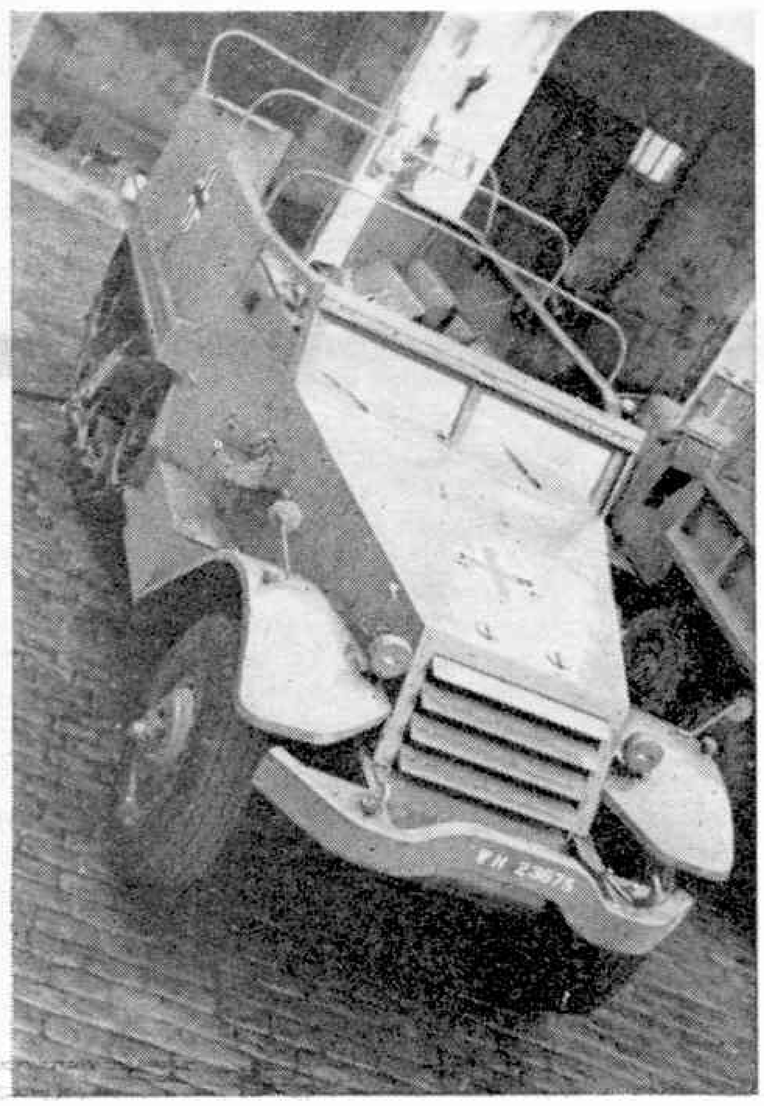
Lower right: the Dorner 29 was a very special version with tilting pusher propellers to enable short take-offs to be made

TABLE TOP BATTLES

the rules of the game by H.L.D.



LAST month we gave you some ideas on the types of heavy equipment and formations used during World War 2. By scaling down these formations you can use them for battle-games, and in doing so we hope you will find the hobby of modelling military equipment a most rewarding and worthwhile pastime. Meccano Magazine will help you by describing the actual construction and painting of such models and next month we start off by showing how you can equip your American forces with essential artillery support. Now, here are a few basic battle-game rules. We must emphasise that these are only examples intended to help you form your own set of rules to suit your particular circumstances. Further ideas can be gained by reading 'Little Wars' by H. G. Wells—the book that started this type of game, and Donald Featherstone's books on War-gaming.



Movement

In addition to your models and troops, you need a ruler and a pair of dice, moves being made when it's your turn to throw the two dice. The maximum distance travelled is determined by the dice. For instance one inch can equal every ten miles per hour of the vehicle's speed. This, in effect, represents all the chance factors that exist in any journey. For every point on the dice a vehicle moves a distance depending upon its maximum speed (i.e. 25 m.p.h. equals 2½ inches, thus a dice thrown ten points equals twenty-five inches).

The average road speed of those vehicles we have already mentioned can be grouped as follows:
10 m.p.h. Churchill VII.
20 m.p.h. Tiger 1. Assault gun, Sherman, Matador and 5.5 inch howitzer.
25 m.p.h. Panther, Carrier Quads with 25 pdrs.
30 m.p.h. M-3 halftrack, Sd Kfz 234 Armoured car, most lorries.
35 m.p.h. Jeeps.

Tracked or semitracked (i.e. halftrack) vehicles usually are the only ones that can successfully travel off the roads. Wheeled vehicles can sometimes where the terrain is suitable. However, in all cases travel cross country is at half speed. A division can move as a unit but its overall speed is reduced to half that of the slowest vehicle. This allows for any traffic congestion that may be caused by a large unit on the move.

The Battle

For the actual fighting: any gun can take three shots but only at one target. A tank with its fully rotating turret can engage a second target but can only have one shot at each. Before firing you must indicate your target. Again the dice decides whether or not it is a hit or miss. Above six being a hit, below a miss. Once you have taken your firing move you must wait until the opponent returns fire or moves away. Camouflaged anti-tank guns, or even dug-in tanks cannot be fired upon until they have given away their position by firing. They can, however, be overrun by advancing infantry. To prevent capture you can blow up equipment but each demolition is equivalent to one shot. Once equipment has been captured, the troops must be given time to familiarize with it before using it.

Armour

The armour of real tanks is thickest in front where they are most likely to be hit. In exceptional circumstances it may be possible to attack them from the rear and this will result in the destruction of even the heaviest tank. However, the actual chance of this happening is small (and in battle-games it can lead to arguments). So let's assume a uniform armour thickness all round. Here is a table that sets out armour thickness of tanks for practical purposes, so that direction of attack does not matter.
Sd Kfz 234 armoured car : 20 mm.
Sherman : 30 mm.
Assault Gun (StuG 111) : 60 mm.
Panther : 80 mm.
Tiger 1, Churchill VII : 90 mm.

The M-3 halftracks and the carriers are proof only against machine gun fire and high explosive blast, and the 'soft skinned' vehicles (lorries) can be destroyed even by machine guns. The following table shows the distance at which various calibre guns can penetrate armour and destroy the tanks.

Armour Thickness. Up to	20mm	30	40	50	60	70	80	90	100mm
6pdr./57mm Antitank guns;	12	12	12	12	12	12	9	6	2 in.
75mm Sherman, Churchill;	12	12	12	12	9	6	2		in.
75mm Assault gun, Sd Kfz 234;	12	12	12	12	12	11	9	6	2 in.
75mm Panther;	14	14	14	14	13	13	12	12	12 in.
88mm Tiger.1.	14	14	14	13	13	12	12	9	6 in.

In last month's caption to the photograph of the Roco Minitanks models, the impression may have been given that since the tracks do not move, the vehicles are therefore immobile. This is not the case, since beneath the tracked vehicles there are concealed four wheels which hold the tracks just clear of the ground and enable the model to be rolled. The wheels are designed so that they can be quickly unclipped when their removal is required. An enlarged Roco Minitanks catalogue is now available and costs 6d., plus a stamped and addressed envelope, from Model Hobby Products, Mebro Works, Cuckoo Hall Lane, London, N.9.

Photographs
Above: German Panzer Grenadiers charge into action from their armoured halftracks
Left: a rare photograph of an M-3 American halftrack in German markings (Warpics Photo)

how to build a speedy skimmer

SKIMMERS are minimum-cost hydroplanes—the sort you can knock up in an hour's work from a shillings-worth of balsa and a spare plastic propeller off an old model aeroplane. Power is a 6 in. to 8 in. rubber band—two, three or more bands if you want more speed. The design is so straightforward you can easily try out modifications to see if you can improve the performance. Cut the sponsons off, for example, and fit another pair of a different size or shape. Vary the size and position of the skegs to improve steering at speed. Better still, make several models with variations on the basic design and try them out against each other.

The basic model is assembled around a *hull plate*, which is simply an 8 in. long panel cut from 3 in. by $\frac{1}{4}$ in. balsa sheet. Use very light sheet for this, as the lighter you can keep the model the better it will perform.

Cut a notch in the centre at one end of the plate and into this cement an upright of 1 in. by $\frac{3}{16}$ in. *hard* balsa. Dimensions for this are given on the plan so that you can cut the top at the correct angle. These dimensions are for a 5 in. diameter propeller. If you want to use a larger propeller, add an extra $\frac{1}{2}$ in. to each dimension for each extra inch of propeller diameter—e.g. for a 6 in. diameter propeller, the dimensions should be $2\frac{7}{8}$in. and $3\frac{1}{8}$ in.

Now cut two bearing plates from thin brass strip. These should be $\frac{3}{16}$ in. wide by about $1\frac{1}{4}$ in. long. Pierce or drill each strip with a hole near the top to take the propeller shaft, and another hole a little more than half way down. Assemble the strips on the 1 in. by $\frac{3}{16}$ in. upright as shown, using the pin. Then bind securely in place and coat the binding with cement. Then fit the propeller shaft carrying the plastic propeller. This can be bent from 20 or 18 gauge wire. Bend the tops of the bearing strips at a slight angle and use a cup washer on the shaft behind the prop. Check that the propeller shaft spins freely in the assembled bearing.

A front hook is required, also bent from wire to the shape shown. This is fitted to the front of the hull plate, passing one end up through the plate and then turning the wire over to lock it in place. A coat of cement over the wire will also help to hold it in position to the bottom of the plate.

The sponsons are shaped from very light block balsa 1 in. wide. Start with the standard shape shown, which is 4 in. long and thus cut from 4 in. by 1 in. by $\frac{1}{4}$ in. block. Simply cement these sponsons directly to the bottom of the hull plate. Then add the skegs, cut from $\frac{1}{16}$ in. sheet balsa, also cemented directly to the bottom of the hull plate at the other end.

To improve the appearance of the model you can then cut and fit a fairing strip, as shown; round off the top edges of the hull plate with sandpaper.

Your model should be waterproofed, and the easiest way of doing this is to give it three or four coats of clear dope, allowing time for each coat to dry and sanding lightly before adding the next coat. Alternatively, if you want a really smart appearance, cover the whole model with 'Monokote'. This is an expensive material (costing 25s. per sheet), but you only need a small amount and many retailers will sell you 'Monokote' offcuts, or small pieces cut from a full size sheet. The advantage of 'Monokote' is that you get a waterproof and glossy finish in colour, just by covering.

Experiment with different sizes of motor until you find the right size to give a snappy planing performance, but not too short a motor run. Much will depend on the size of pond you are going to operate on, but your skimmer can come to no harm if it runs out of power in the middle. You will just have to wait until it drifts in.

Here are some tips on performance :

(i) For more speed, simply increase the power of the rubber motor—i.e. add another band or increase the number of strands if the motor is made up from rubber strip.

(ii) For a longer motor run increase the *length* of the rubber motor.

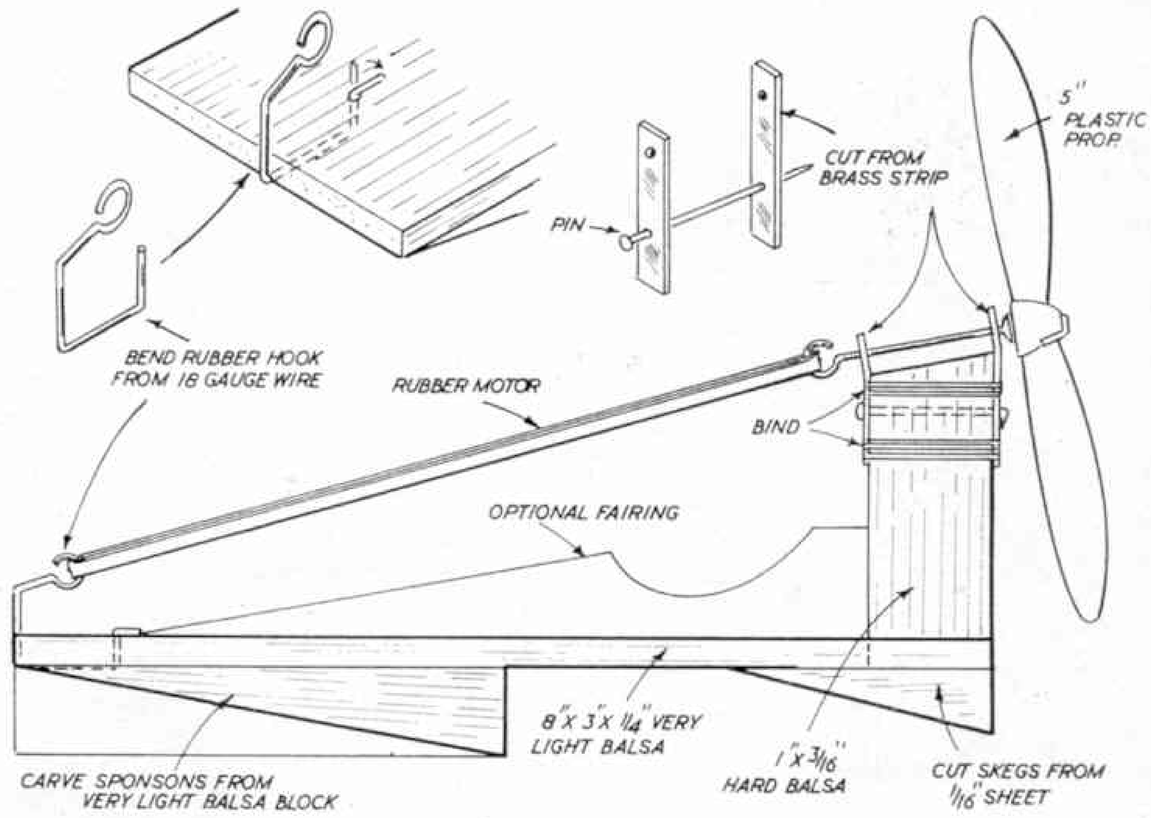
(iii) Use a winder to wind the motor, detaching from the front hook to fit onto the winder hook. Lubricate the rubber with castor oil and stretch the motor out to about three times its normal length as you wind it up. This will enable you to put on more turns.

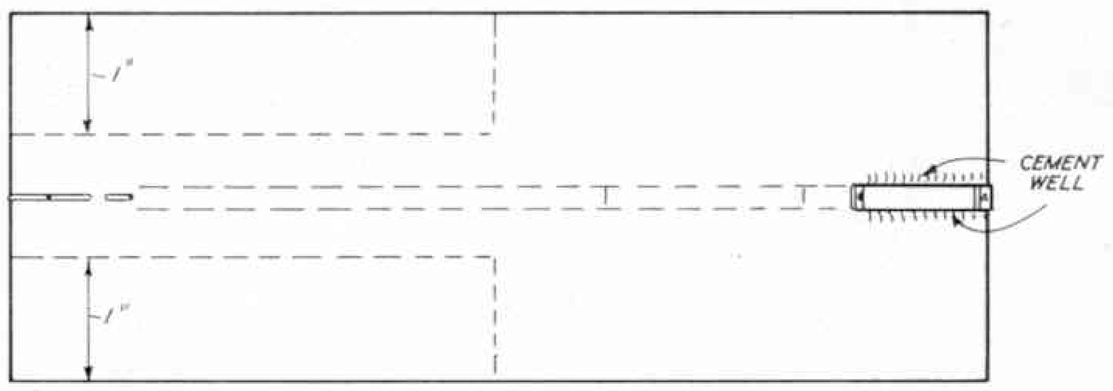
(iv) For a further improvement in performance, try polishing the hull with wax polish.

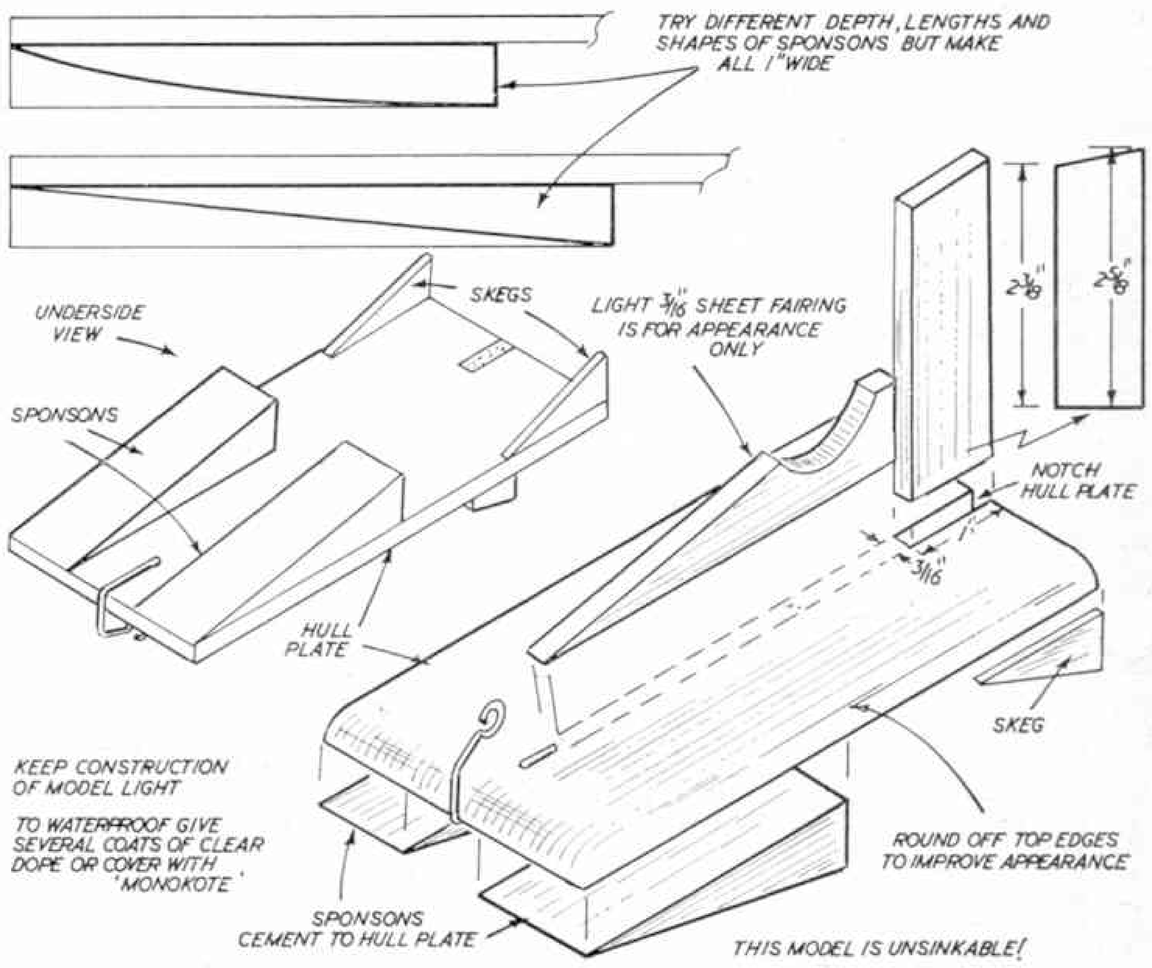
(v) Try different propellers. Those with wide blades will usually produce more thrust and speed, but may need a more powerful motor.

(vi) Try larger propellers, but 6 in. diameter is about a safe maximum with this size of model. Anything bigger and you may find the skimmer will tend to roll over.

Finally, since you are using an aeroplane propeller, remember to *wind the rubber motor up the opposite way to normal.* If you don't, the model will try to travel backwards!

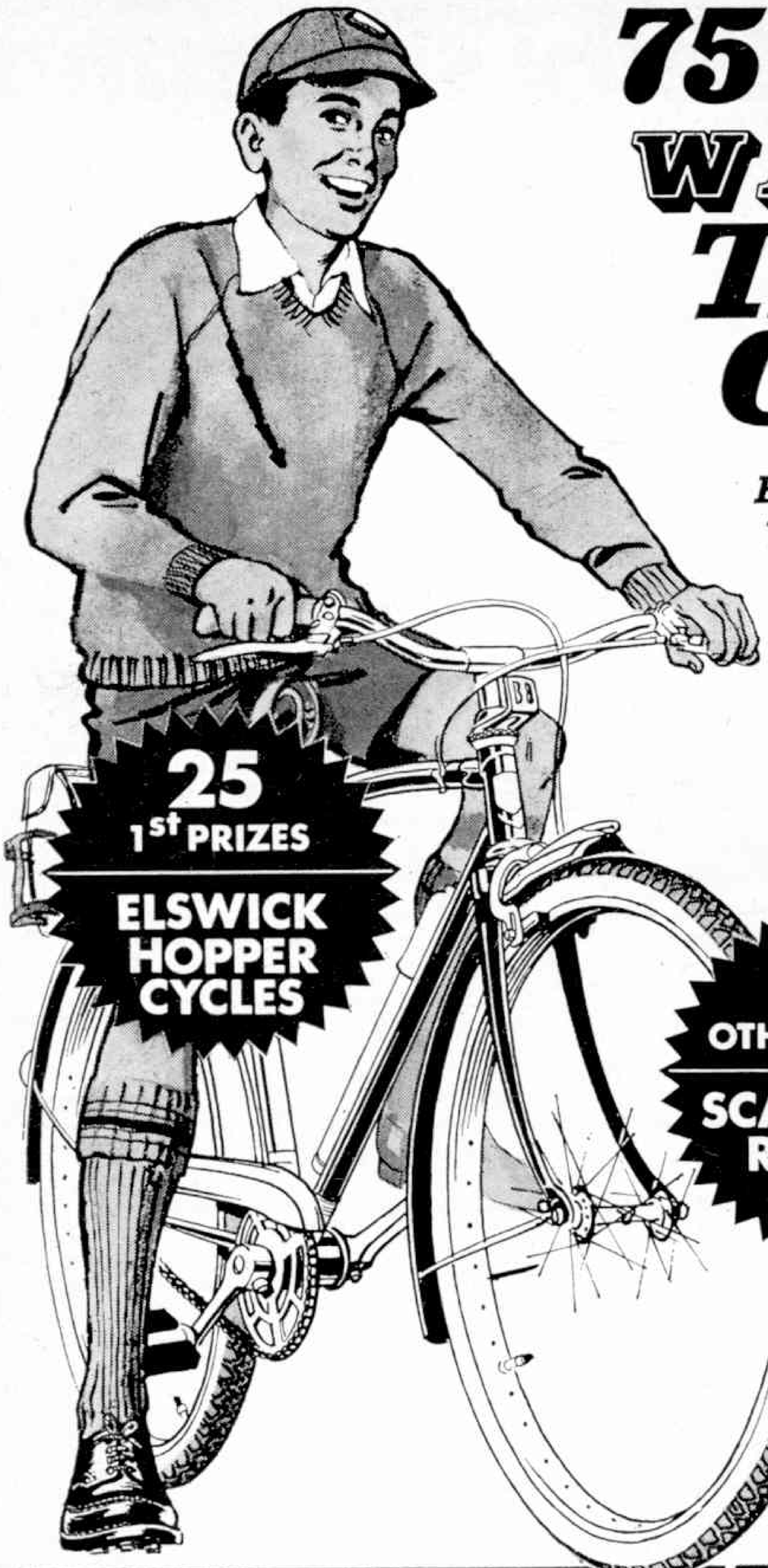

PIN
CUT FROM BRASS STRIP
5" PLASTIC PROP
BEND RUBBER HOOK FROM 18 GAUGE WIRE
RUBBER MOTOR
BIND
OPTIONAL FAIRING
8" X 3" X 1/4" VERY LIGHT BALSA
1" X 3/16" HARD BALSA
CUT SKEGS FROM 1/16" SHEET
CARVE SPONSONS FROM VERY LIGHT BALSA BLOCK




TRY DIFFERENT DEPTH, LENGTHS AND SHAPES OF SPONSONS BUT MAKE ALL 1" WIDE
UNDERSIDE VIEW
SKEGS
LIGHT 3/16" SHEET FAIRING IS FOR APPEARANCE ONLY
SPONSONS
2 3/8"
2 5/8"
NOTCH HULL PLATE
3/16"
HULL PLATE
SKEG
KEEP CONSTRUCTION OF MODEL LIGHT
TO WATERPROOF GIVE SEVERAL COATS OF CLEAR DOPE OR COVER WITH 'MONOKOTE'
ROUND OFF TOP EDGES TO IMPROVE APPEARANCE
SPONSONS CEMENT TO HULL PLATE
THIS MODEL IS UNSINKABLE!

75 Big Prizes in WAYFINDERS Tracking Competition

Easy to win ! Fun to enter !
You get five chances for a prize
when you choose Wayfinders !

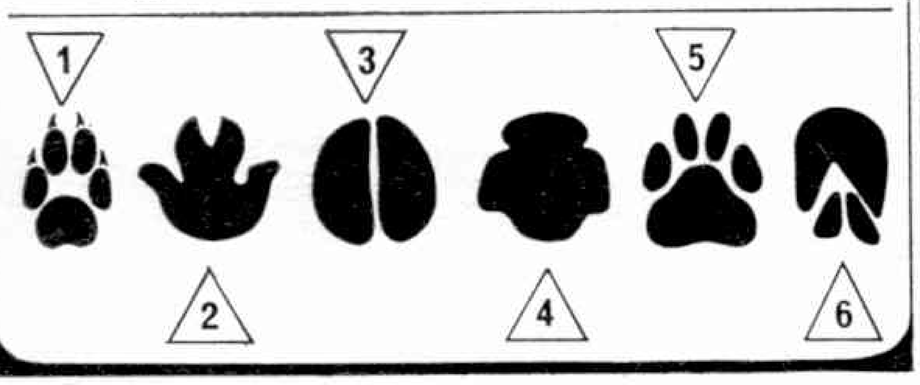


25
1st PRIZES
ELSWICK HOPPER CYCLES

50
OTHER PRIZES
SCALEXTRIC RACING SETS

Ⓐ HIPPO Ⓑ WOLF Ⓒ BUFFALO

Ⓓ ZEBRA Ⓔ RHINO Ⓕ TIGER



HERE'S HOW TO ENTER

You just match up the animals shown at left with their tracks. For example, if you think track 4 is that of Tiger 'F', insert 4 in box opposite F . . . and do the same until all animals are paired up. Then complete the sentence below. using not more than ten words.

YOU ARE ALLOWED UP TO FIVE TRIES PER ENTRY . . . SO YOU HAVE FIVE CHANCES TO WIN !

Post your completed entry along with shoe illustration *from Green Guarantee Slip found in Wayfinders box to :* Wayfinders Competition, 18-20 St. Andrew St., London E.C 4. (Comp.)

	TRY 1	TRY 2	TRY 3	TRY 4	TRY 5
A					
B					
C					
D					
E					
F					

NAME.....
BLOCK CAPITALS
ADDRESS.....

.....AGE.....SHOE SIZE.....

I LIKE MY WAYFINDERS BECAUSE.....

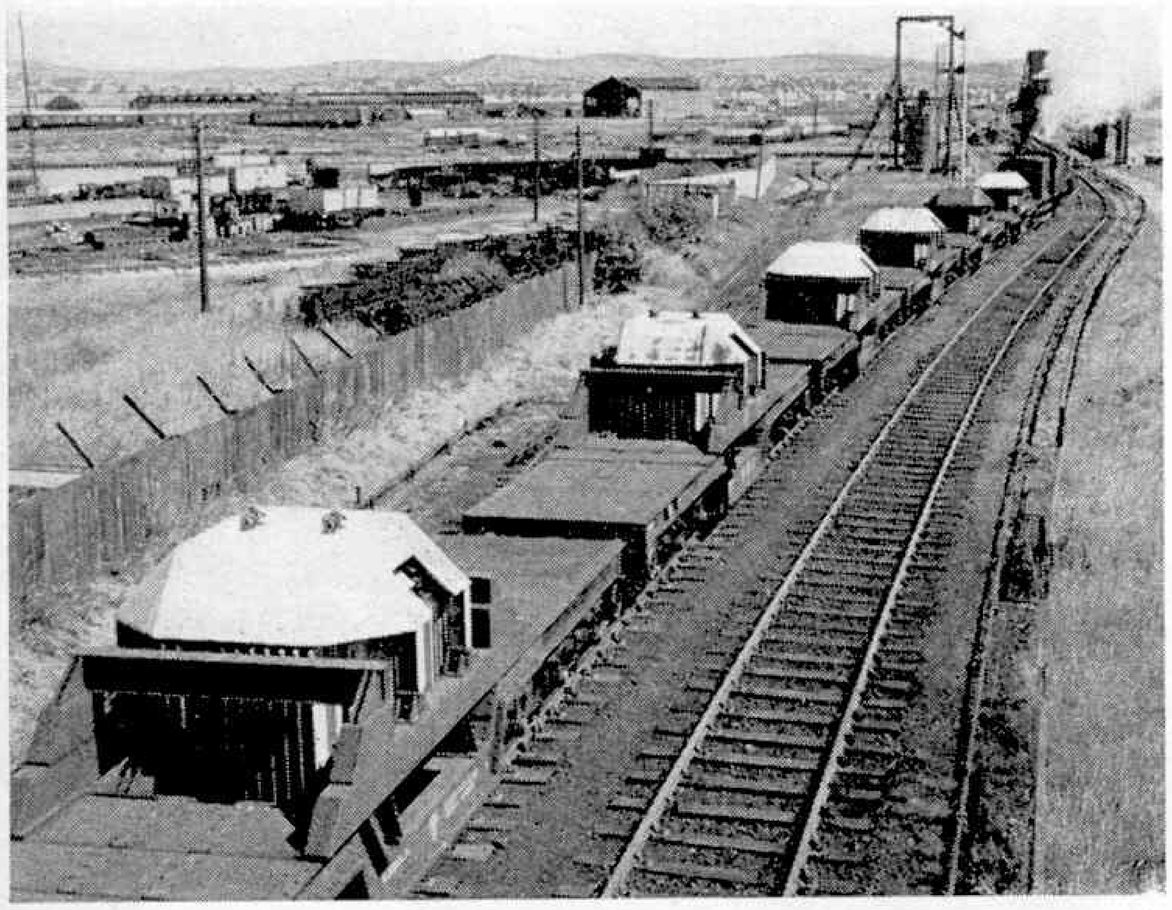
.....

.....

Entries valid only on purchases during contest period. M/1

PLEASE CUT OUT

Railway Notes



● **Atomic Fuel Trains** Special trains have been arranged by the London Midland Region to convey irradiated fuel elements, used in nuclear power stations, from Barrow-in-Furness to Sellafield, for the United Kingdom Atomic Energy Authority's reprocessing plant at Windscale. The trains consist of six specially constructed 50 ton rail vehicles, each of which is loaded with a steel 'flask' carrying the fuel elements. These are sent to Windscale by the Italian state electricity authority, from Italy's first commercial nuclear power station at Latina, some 40 miles south of Rome, which has been supplying the Italian capital with electricity since 1963. The natural uranium fuel for Latina—a British-designed station—is provided by the United Kingdom Atomic Energy Authority, and after being 'burned' in the reactor the used fuel is regularly transported back to Britain for reprocessing and to recover the valuable plutonium it contains.

● **Special Trains for Overhead Maintenance** When the London Midland Region's electrification scheme for its main routes between London, the Midlands, and the North-West is complete, overhead traction equipment will have been erected above 1,480 track miles of railway. Every foot of this equipment—from which electric trains pick up current of 25,000 volts, has to be regularly inspected and maintained.

Specially designed trains, one of which is in service at Rugby, will be used for this purpose. Located at various points along the electrified routes they combine the functions of a mobile workshop, store, and working platform, and will be fitted out to carry everything needed to deal with routine maintenance and emergency repairs to overhead line installations.

The train in service at Rugby consists of seven flat-topped converted coaching stock vehicles with flat wagons carrying drums of cable attached at either end.

● **Freightliner Birthday** Freightliners, which British Rail rate among their biggest commercial successes in recent years, have had their first birthday. This by chance, happened to occur only a few days after the 20,000th loaded container had been carried since the service started on the Glasgow - London route in November 1965 when the first two trains carried only six loaded containers. By February 1966, the monthly total had doubled and by the end of August the total number carried exceeded 10,000. Now freightliners are carrying 1,000 containers a week and more than 600 customers have used the service. The 20,000th container was sent from London to Manchester with radio and television sets by the Co-operative Society at Romford to their premises at Handforth, Cheshire.

● **New Station at Pudsey** The North Eastern Region of British Rail intend building a new passenger station at New Pudsey, between Leeds and Bradford. It will be built at Dawson's Corner, west of the existing Stanningley Station and when built, will be a small but modern building with two 400 ft. long platforms connected by a foot bridge.

WAYFINDERS COMPETITION RULES

Competition closes 3rd April, 1967.

1. All boys living in the U.K. may enter, providing they are under 15 on 3rd April, 1967. Children of employees of the manufacturer of Wayfinders, or of their advertising agents, and of anyone directly connected with the competition, not eligible.

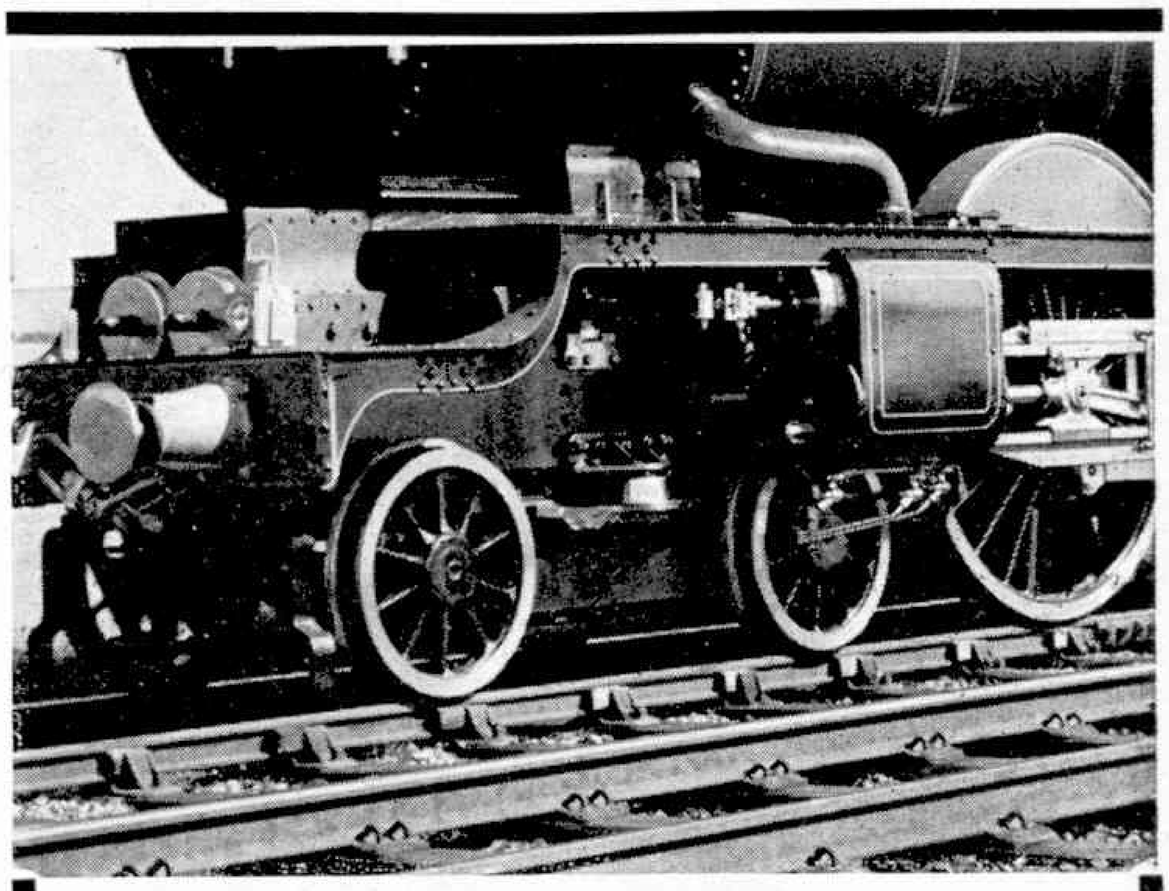
2. All entries will be examined, and the 25 first prizes of bicycles will be awarded to the competitors who have correctly matched up the animals with their tracks, and who have, in the opinion of the judges, most aptly and convincingly completed the unfinished sentence. The 50 prizes of Scalextric Racing Sets will be awarded to the next best entries. Full allowance will be made for age. No competitor may receive more than one prize.

3. Decision of judges is final and legally binding. No correspondence will be entered into.

4. Each completed entry must be accompanied by shoe illustration from Guarantee Slip found in Wayfinders box. Entries received without this illustration will be disqualified.

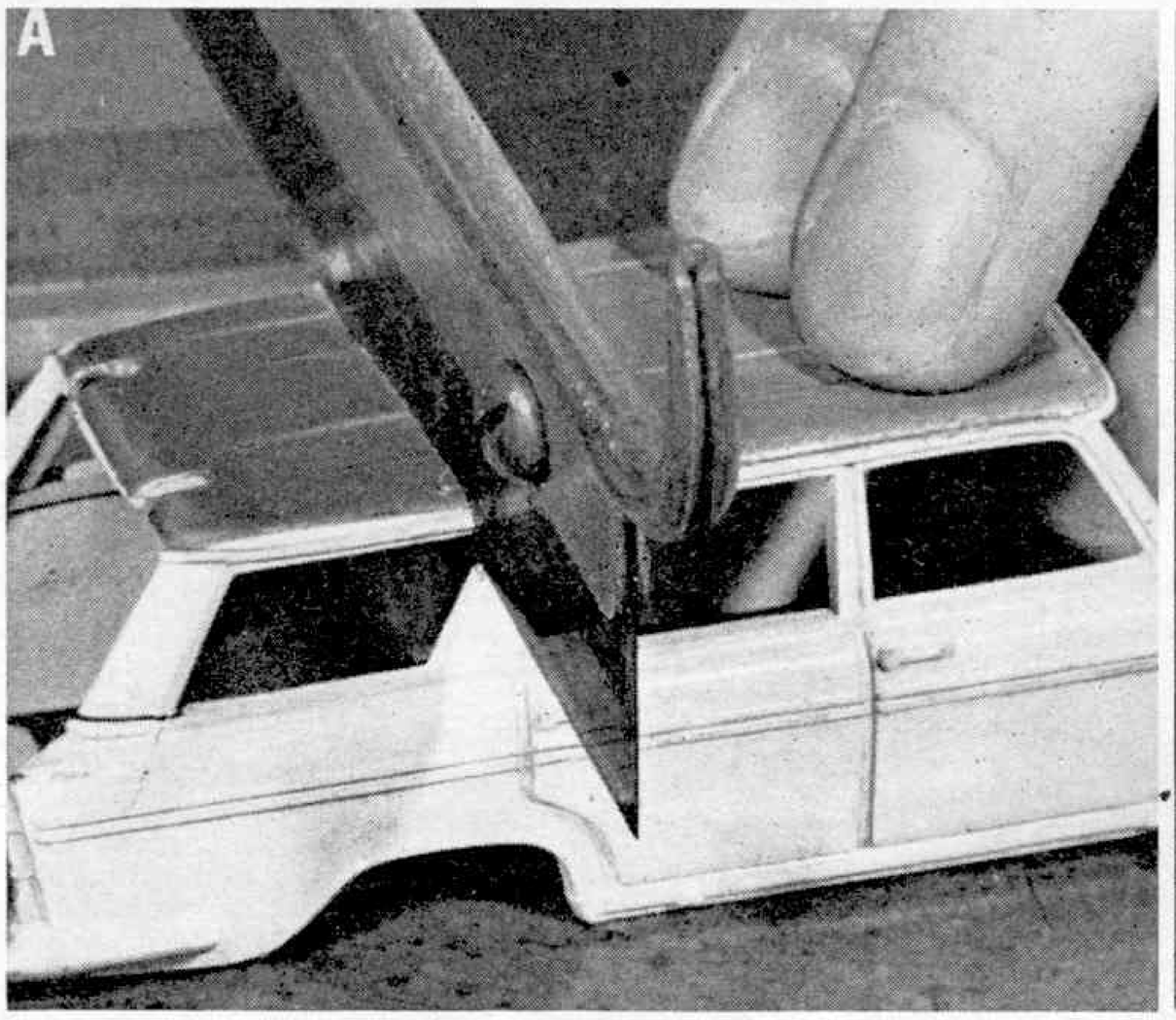
5. No responsibility can be accepted for entries delayed, damaged or lost in the post. Altered entries, or those which are unreadable or late, will be disqualified. Entries become the property of the manufacturer of Wayfinders and cannot be returned.

6. Every winner will be notified by post. A complete list of winners can be obtained by sending a s.a.e. to Wayfinders, 151 Oxford St., London W.1. A complete list of winners and the judges' solution to the problem will be published in this magazine.



LOCO SPOT

The locomotive featured in the February "Loco Spot" showed part of an L.M.S. class 4 2-6-4T locomotive, No. 48442. This class of locomotives built by Sir William Stanier and introduced in 1935, was a tapered boiler design. This month's picture shows some distinctive features of a quite well known class of locomotives. Can you guess it?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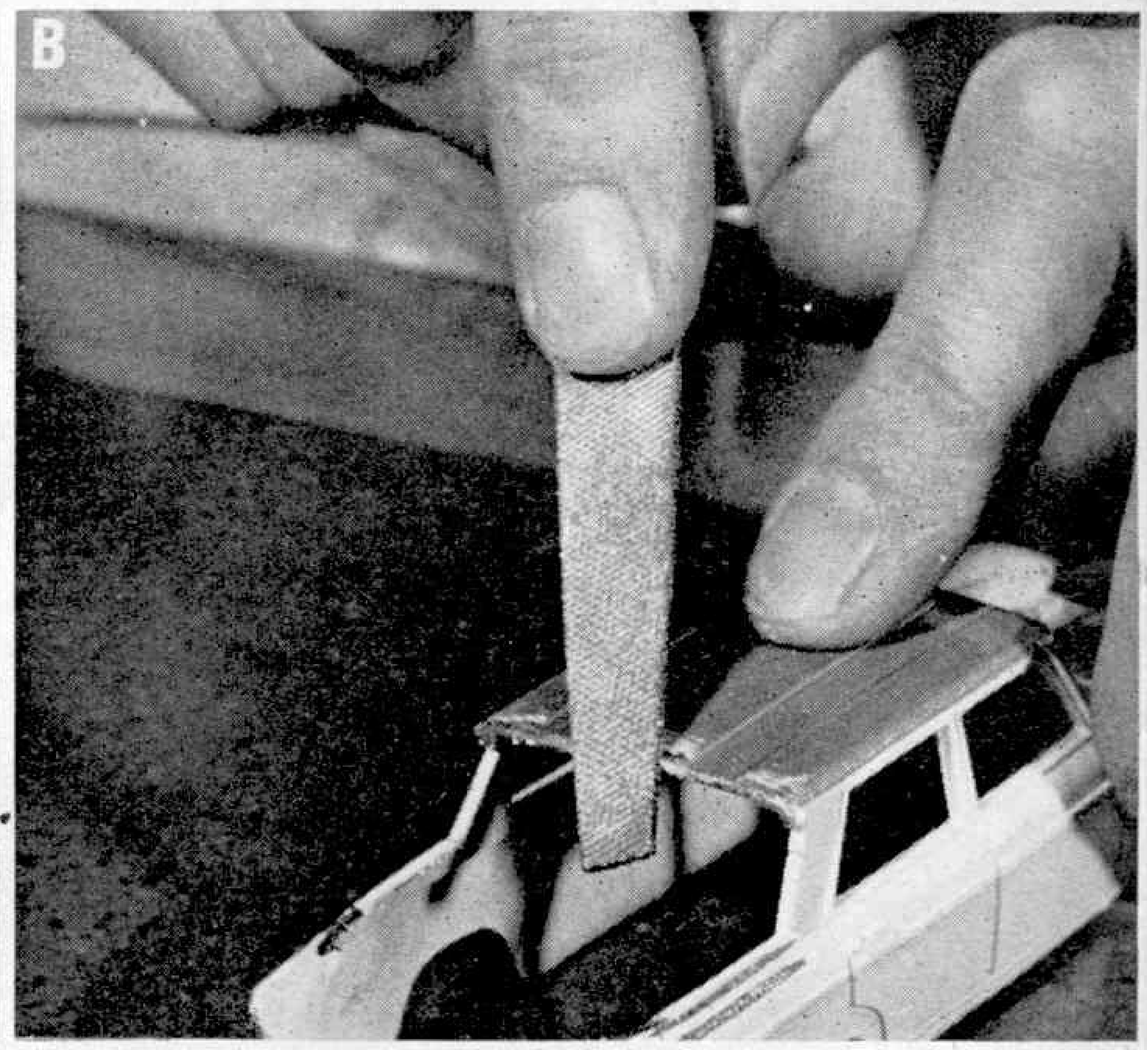
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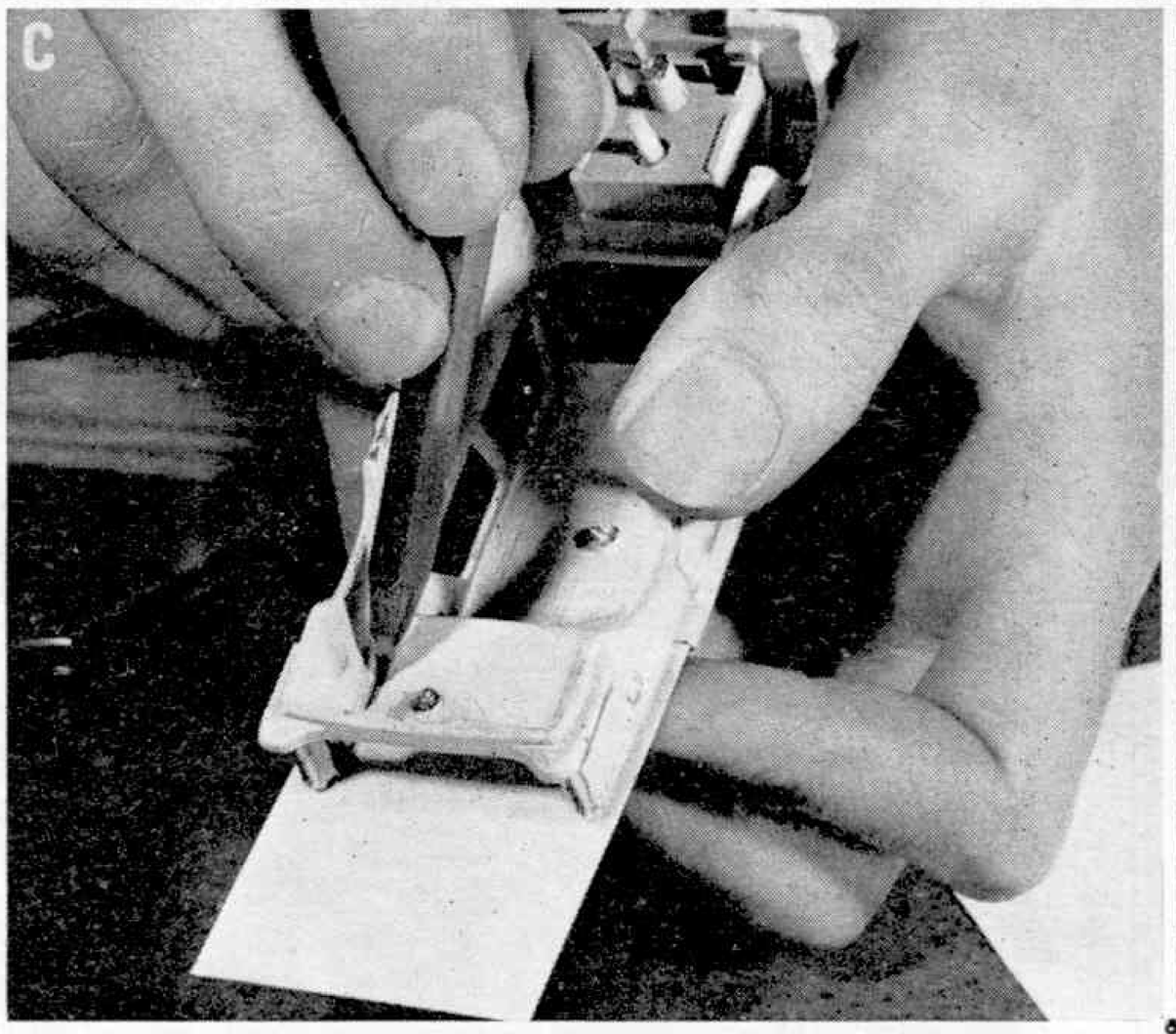
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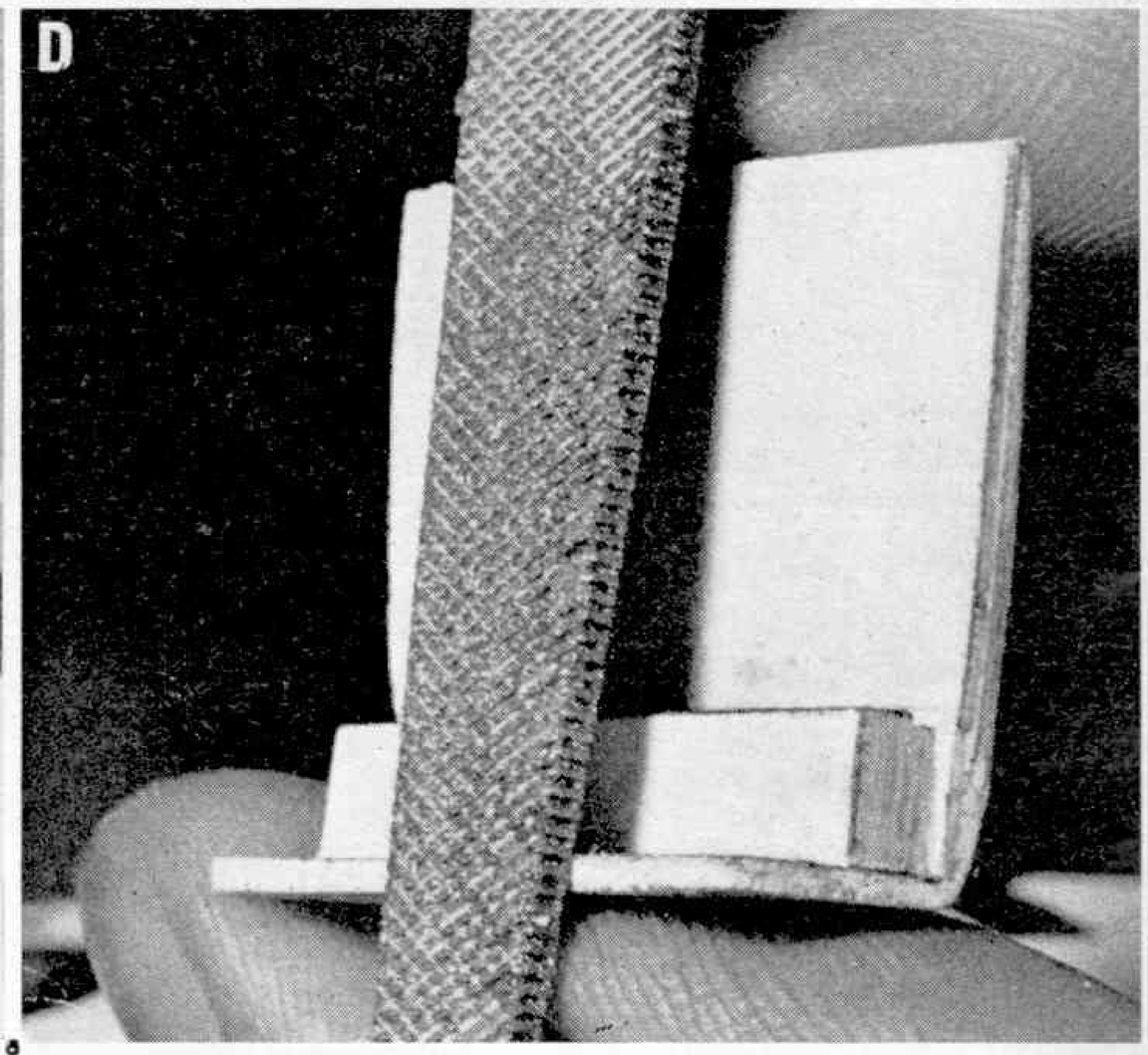
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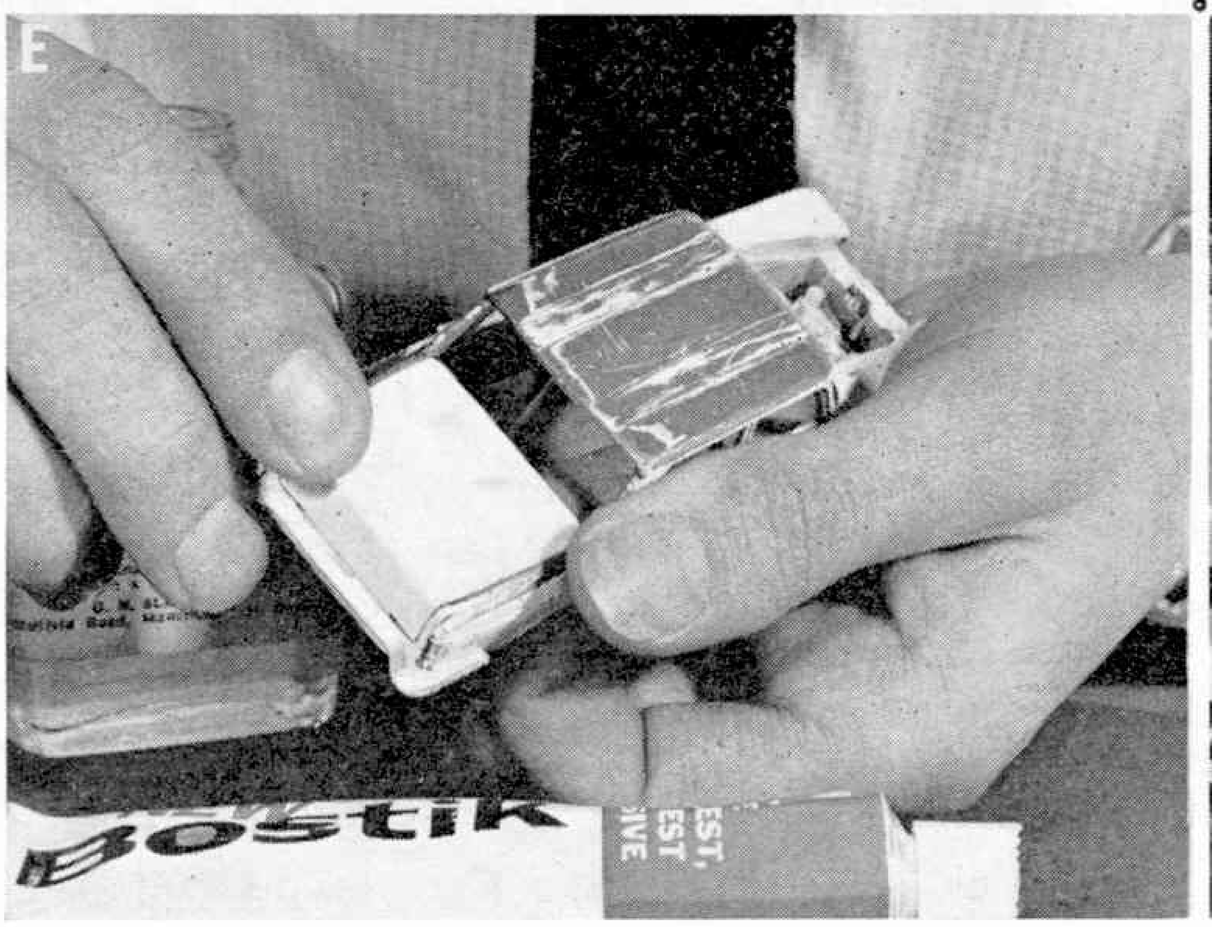
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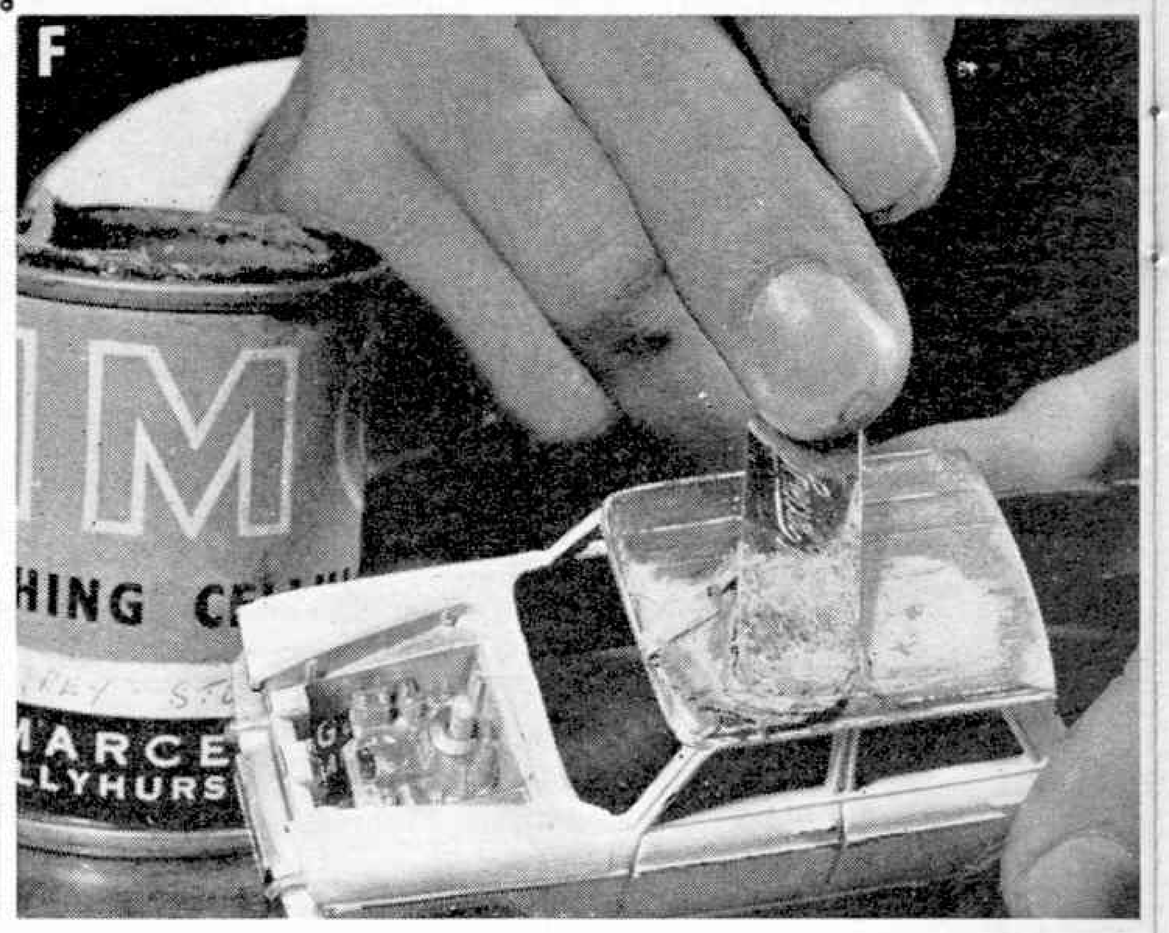
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from station wagon to saloon

by Chris Jelley

Since, at the time of writing, the latest Dinky Toys were not quite ready, I have decided to describe this month, a rather interesting customisation job—converting Dinky Toy No. 172, Fiat 2300 Station Wagon into the saloon version. The tools you will need are a hack saw, a modelling knife, a fairly coarse file, a fine needle file, a pencil, a rule, a wheel brace and a $\frac{1}{8}$ in. drill. Other materials are a sheet of 20 thou. Plastikard, a sheet of clear acetate, a plastic solvent, some Bostik 1 or Evostik and a tube of Plastic Padding.

A After removing the base and interior fittings of the Dinky Fiat 2300 Station Wagon, the back of the roof is cut away with a back saw or hack saw.
B Filing the cut-away casting to shape. The back of the roof is rounded while the tops of the rear wings are straightened and formed into low fins.
C The new boot is built up from opaque Plastikard. Here the basic shape of the boot top is being marked on a small piece of Plastikard, using the casting as a pattern.
D The final shape of the new boot lid is obtained with a file. Note the strengthening block, built up from six $\frac{3}{16}$ in. wide strips of plastic, in the angle of the boot.
E Only when you are satisfied that both the casting and the boot are as correctly shaped as possible should the boot be glued into position with contact adhesive.
F The two depressions of the roof are filled in with Plastic Padding, which, when dry, is filed flat.

Before and after!

First stage in the operation is to remove the base, seat moulding and window moulding of the Station Wagon. The base and window moulding are riveted in place, and it is therefore necessary to remove the heads of the rivets. This is most easily done by using the brace and $\frac{1}{8}$ in. drill, remembering first to make a small punch mark in the centre of the rivet to prevent the drill wandering. The tailgates and bonnet should also be removed to leave the basic casting, but don't throw the bonnet away as this is needed later.

Modification can now begin. Take the casting and, using the saw, cut through the rear roof stays level with the windowsill, then cut across the roof in a straight line approximately $\frac{1}{16}$ in. behind the next pair of window stays. Remove the rear section of the roof and file the back of the remainder until a slightly curved shape is obtained, the corners now running right up to the back of the window stays. Also, file the top/rear of the roof to give a rounded effect.

Next to be filed are the rear wings, which is perhaps the most difficult part of the re-shaping. If everything has so far been carried out correctly, you will see that what was originally the rear windowsill still remains and, with the removal of the rear window stays, curves backwards and inwards to just forward of the rear bumper. These sills and the tops of the wings must be filed until running almost straight back, and their upper edges must also be brought to blunt points. In all the filing operations the coarse file is used to obtain the rough shape and the needle file to achieve the smooth final shape.

Now comes the job of making a new back for the model, using the opaque plastic sheet. First cut a rectangular piece approximately $1\frac{1}{2}$ in. by 1 in. wide from the plastic sheet with the modelling knife. When using Plastikard, incidentally, it is not necessary to cut right through the plastic, but simply to score out the shape required, which can then be snapped out of the sheet. Place the piece of plastic over the rear wings and mark on its underside the inside shape of the wings from the back of the rear roof supports to points vertically in line with the rear bumper, then join the points with a straight line. Using the knife, cut out the resulting shape a little oversize to allow for final fitting and trim to shape so that it fits exactly between the wings. Now cut out another rectangle $1\frac{1}{16}$ in. long by $\frac{3}{8}$ in. wide and shape it until it fits exactly between the back of the rear wings. If, when the two shaped sections are held in place, the whole back is completely enclosed, the parts can be stuck together using the plastic solvent. A strengthening block, the width of the boot, is built up from six $\frac{3}{16}$ in. wide strips of plastic stuck together with solvent, and is glued in the angle between the two parts.

To further increase the strength of the boot and to give it sufficient thickness to allow for shaping, another one or two layers of Plastikard are added using the basic item as a pattern. When this is finished and the solvent perfectly dry, the complete unit is carefully filed to its final shape. This not only means shaping it to fit exactly in place, but also means rounding off the angle between the top and back and filing the top to give it a slightly curved shape, particularly at the edges. Note, too, that the rear bumper has two slightly raised sections in it, therefore allowance must be made for these along the lower edge of the back. In addition, the real car has a thin chrome strip running across the back, at the same height as the two strips along the sides (these are represented on the Dinky Model), and a raised rectangular number plate. Both these items can be represented on our boot by suitable pieces of Plastikard. When you are satisfied that the boot is as perfect as possible, glue it in position using the contact adhesive.

The two depressions in the roof of the model must be filled in as these are not present on the real Fiat 2300 saloon. Plastic Padding is used for this, the paint on the roof first being removed with the needle file. The Padding is applied according to the instructions supplied with it and, when dry, is filed to shape. Next, the original window moulding is replaced and the section aft of what is now the rear roof supports is marked off. The moulding is removed and this rear section is cut away with the modelling knife.

After being tidied up with the file, the moulding can be fixed in position, using the contact adhesive, then the rear window can be cut out of the clear acetate sheet and stuck in place, also with the contact

Continued on page 29

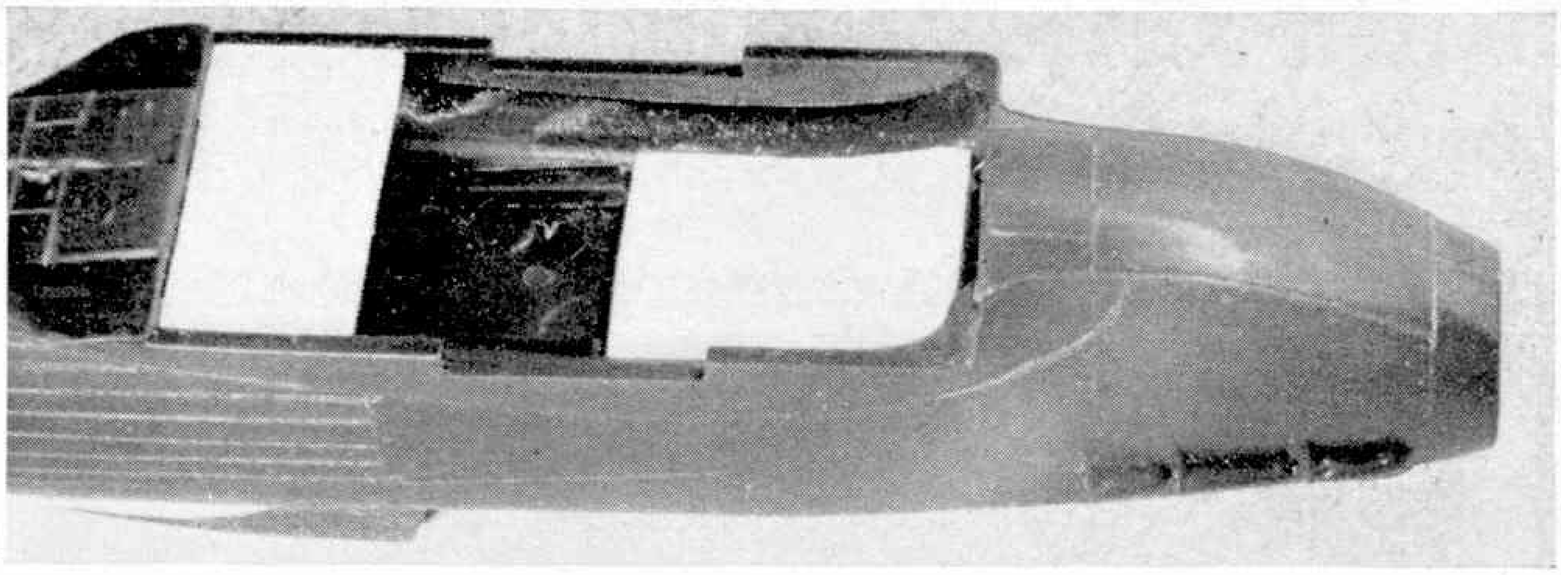
WITH EVERY THING DOWN

by Doug McHard

Here's a model to delight the hearts of all World War II aircraft fans. It is without doubt the best 1/72nd Hurricane that has ever been offered and will be in great demand for a long time to come. This new Frog kit can be built as a Mk. 11C or as a Sea Hurricane and underwing bombs and rockets are also supplied in the standard kit. As supplied, the Sea Hurricane variant is assembled with a simulated arrester hook in the 'up' position, but here's an opportunity to fit a correctly retractable one with little effort.

Mounted in flying attitude on a stand, it is common practise to assemble the undercarriage in the retracted position, but it always seems a pity to throw away or hide the beautifully moulded undercarriage parts. A lowered undercarriage in flight, normally a bit clumsy, can be made to look quite acceptable if the flaps *too* are lowered. With a double surface wing moulding, it is a simple matter to cut the flaps from the bottom surface, and re-cement them in the 'down' position.

Doug McHard's picture pages this month show this work being carried out together with one or two extra refinements that keen addicts may like to incorporate.



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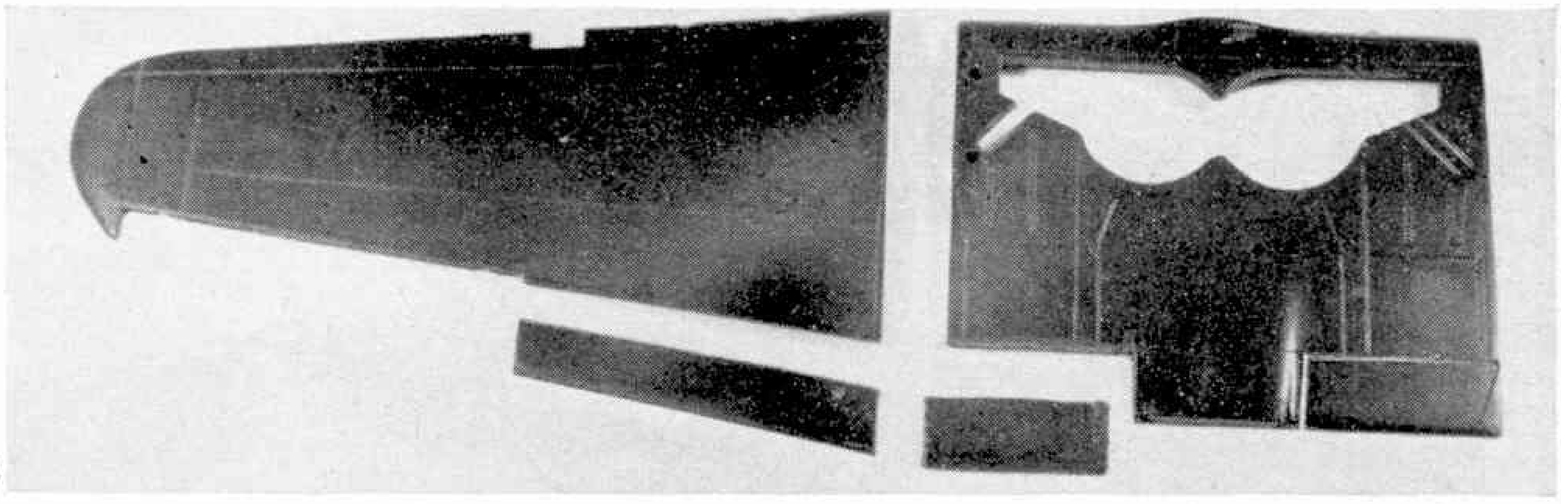

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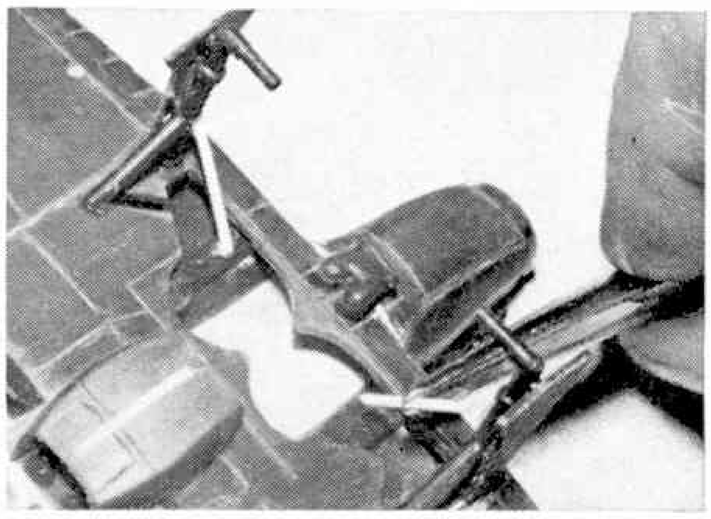

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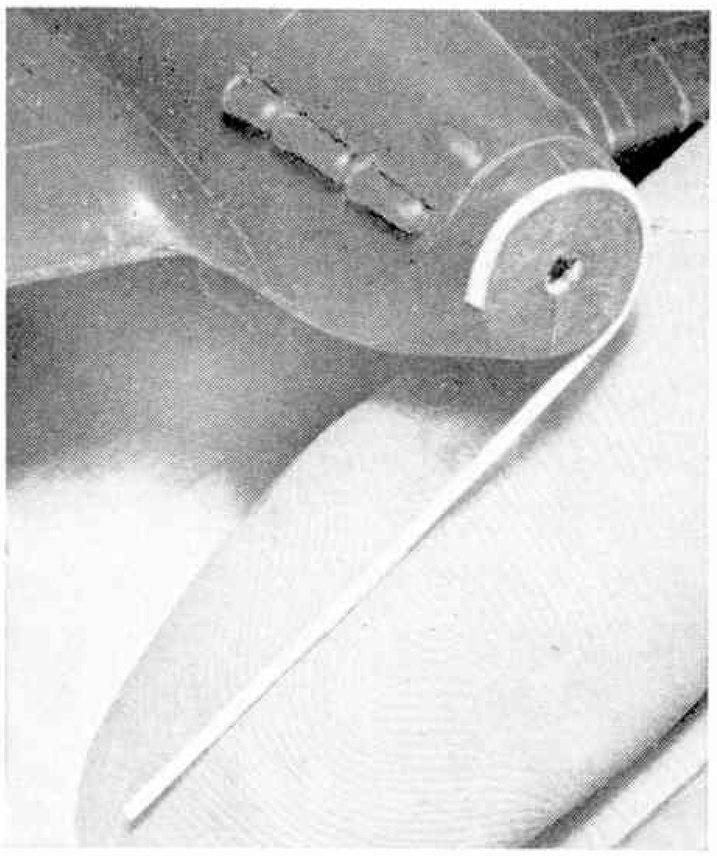

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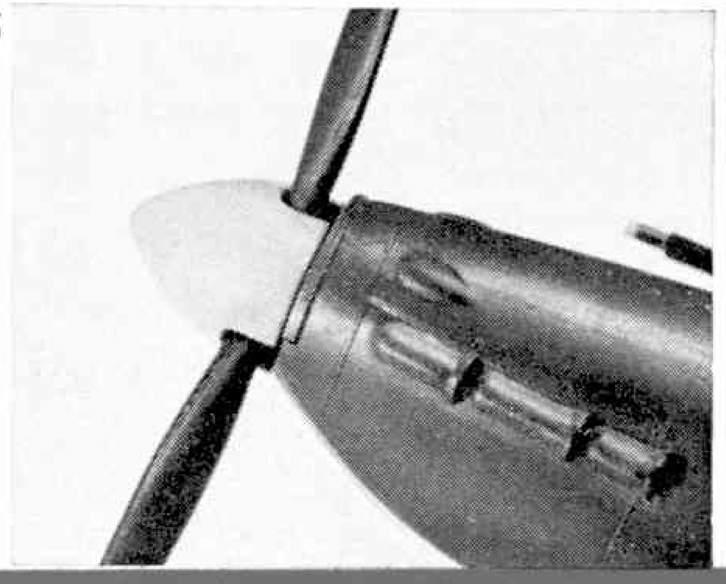

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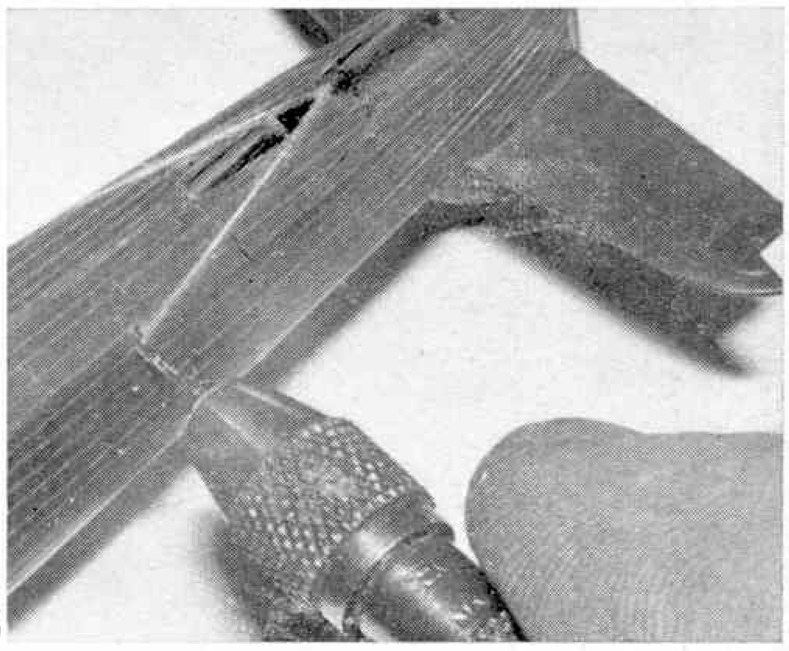

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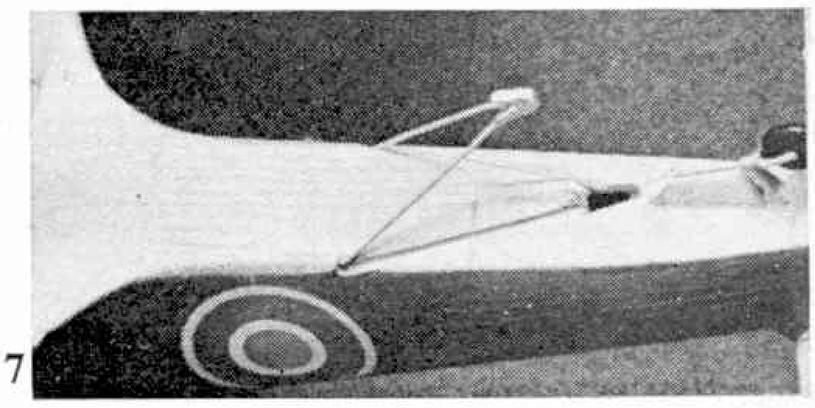

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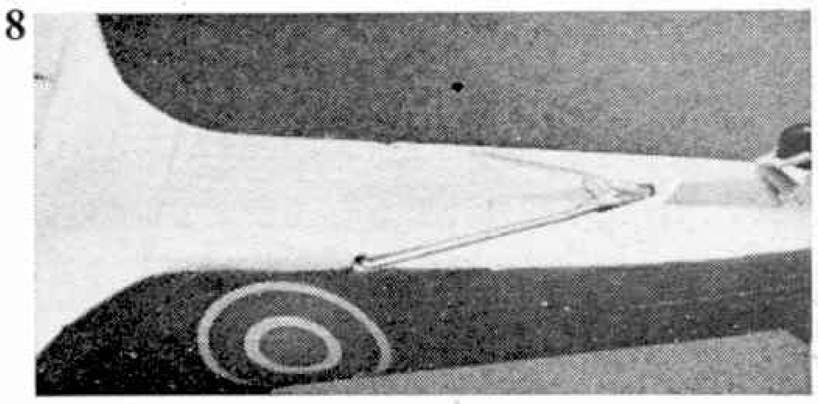

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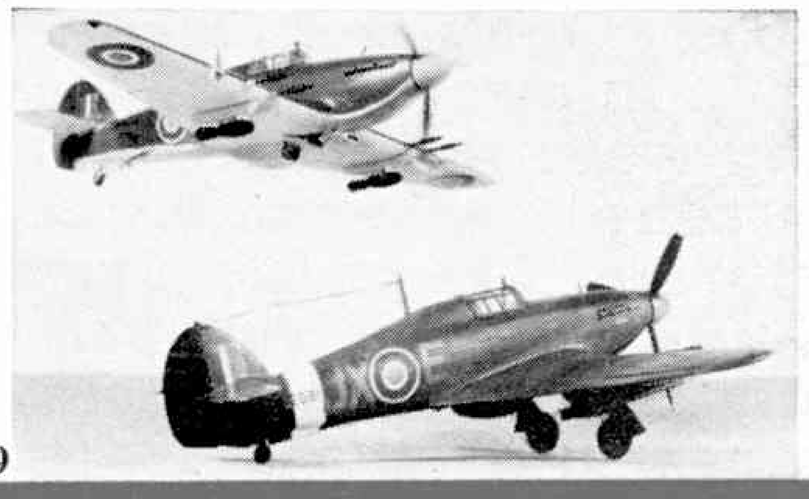

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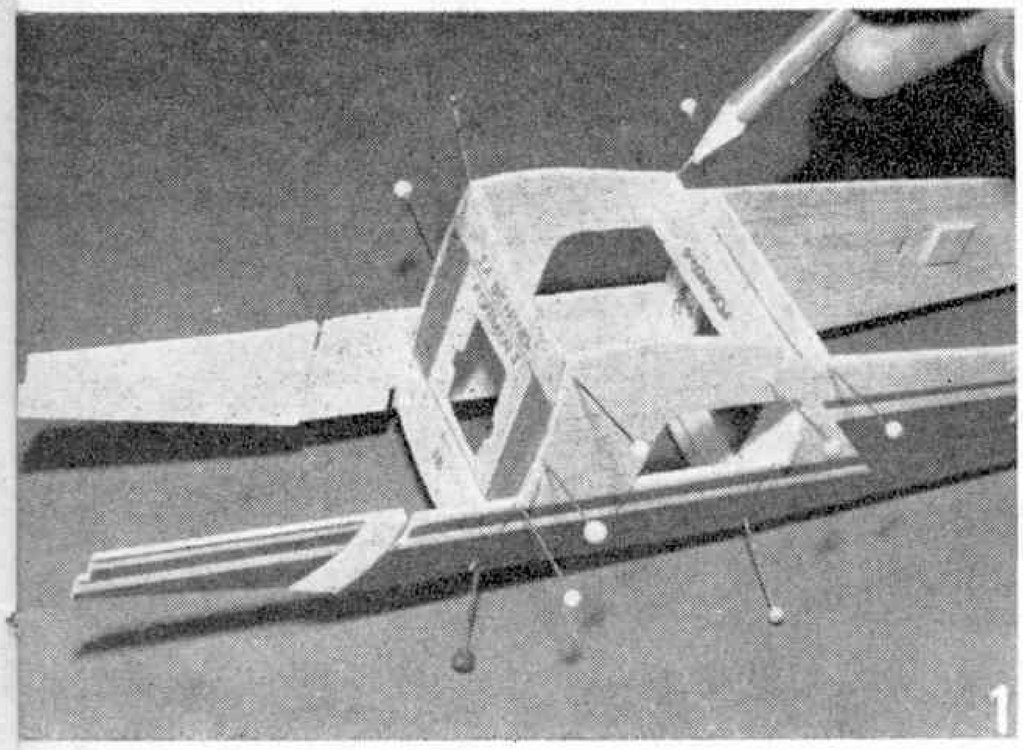
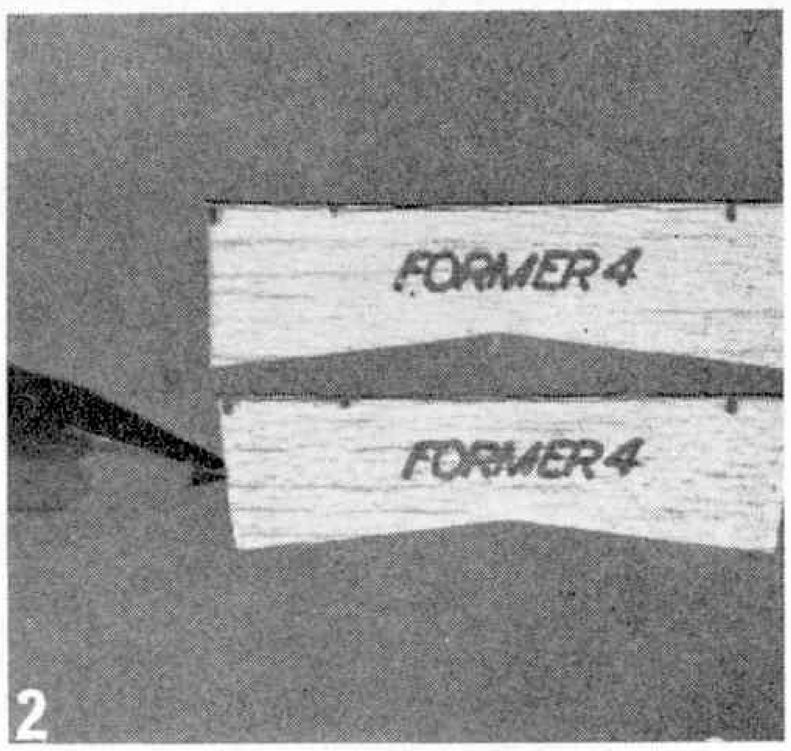
1. If you are going to lower the flaps, it will be as well to blank off the wing cut-out in the lower fuselage with two pieces of Plastikard.
2. Using a sharp knife or a razor saw, separate the flaps from the lower wing surfaces. A slot can also be cut in each of the wheel-well openings to represent the rear undercarriage leg retraction bay.
3. A thin retraction strut can be added where shown. Use stretched plastic sprue for the job. Notice how the rear of the belly radiator has been cut away and note also the flap position. The reason for the Plastikard blanking-off pieces (photo. 1) can be seen here.
4. Later Hurricanes had a thin raised 'rim' round the top of the front nose bulkhead. We made ours with Plastikard Microstrip. The finished job is seen in photo. 5.
6. A saw-cut for each arm of the hook is made as shown (use a razor saw) and a small hole drilled at the forward end of each resulting slot.
7&8. Here's the finished job complete with hook. This is bent from thin wire and the bent-over hook can be thickened up with solder or a resin glue. Turn both ends inwards and clip them into the holes already drilled.
9. Two un-modified models built exactly as specified in the kit. Night fighter on the ground is finished in Kuttlewascher's 'Night Reaper' colours as shown in the Hurricane Profile. Matt transfers are supplied in the kit. The bomb-laden Hurricane with undercarriage retracted is the 'standard kit' Sea Hurricane.

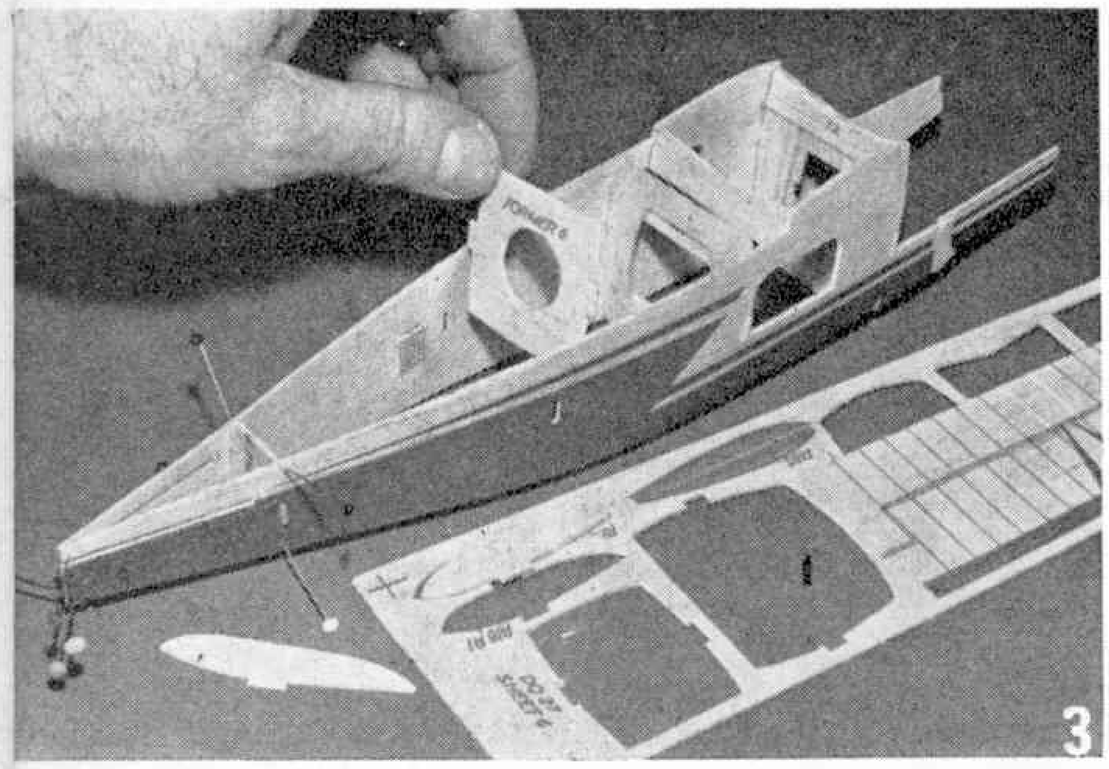
Build a flying model Dornier 27—the plane featured in John Taylor's story on page 10

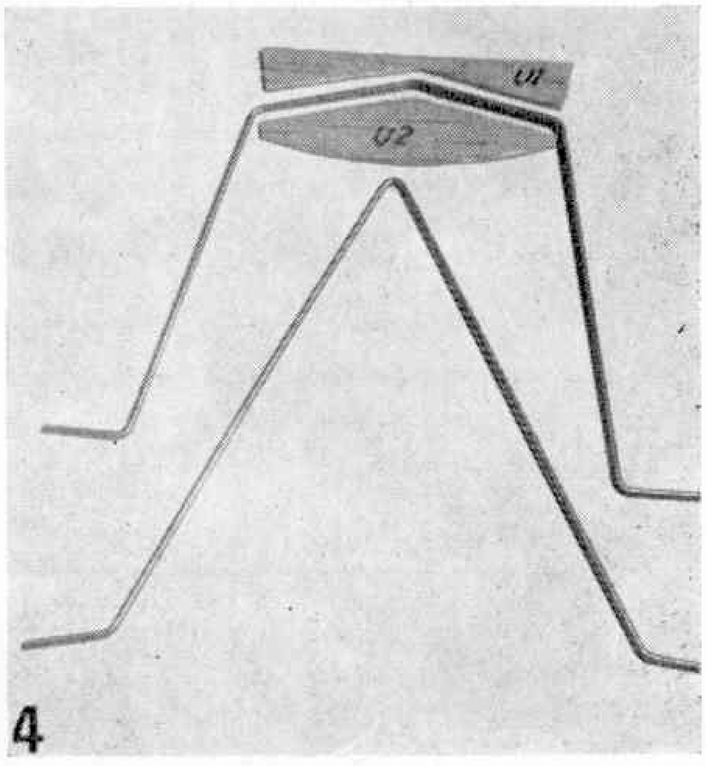
It's an unfortunate, but inescapable fact, that scale models are usually more difficult to build and fly than non-scale types. Even so, small scale kits continue to sell in their thousands, although few of them are ever successfully flown. Much development has recently taken place in all-sheet balsa construction, as a result of which the better examples of such kits have lost that 'boxy' look, yet they are not difficult to put together, are tough and fly well. For instance, it only took a couple of evenings to build our Dornier 27 from the Frogflite Quick-build kit. The finished model is a big 18½" wingspan, looks extremely smart and will rise from the ground under its own power and fly round in a most realistic manner.

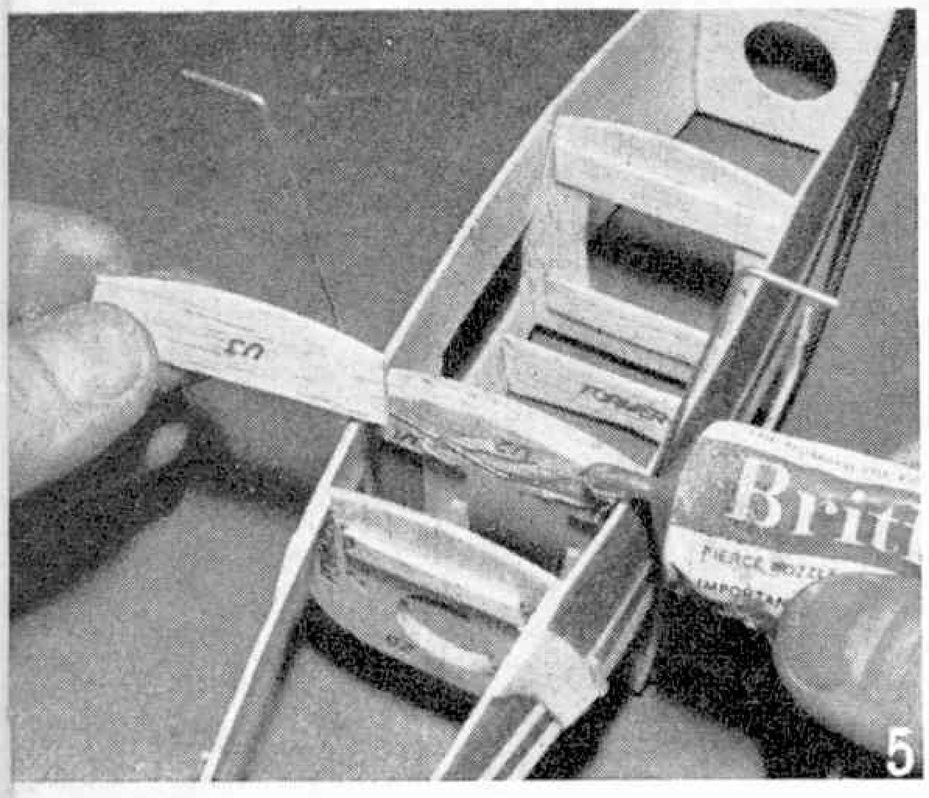
All the parts are pre-coloured and die-cut from excellent quality sheet balsa and the cutting is so 'clean' that the various pieces almost literally fall away from their balsa sheets. Although the model is perfectly satisfactory built exactly according to the kit's detailed step-by-step assembly drawings, there are nevertheless one or two refinements that the keen M.M. reader can introduce to make his Dornier 27 even more realistic. Doug McHard offers some building hints on these two pages and the photographs will prove how easy-to-build a real flying scale model can be.

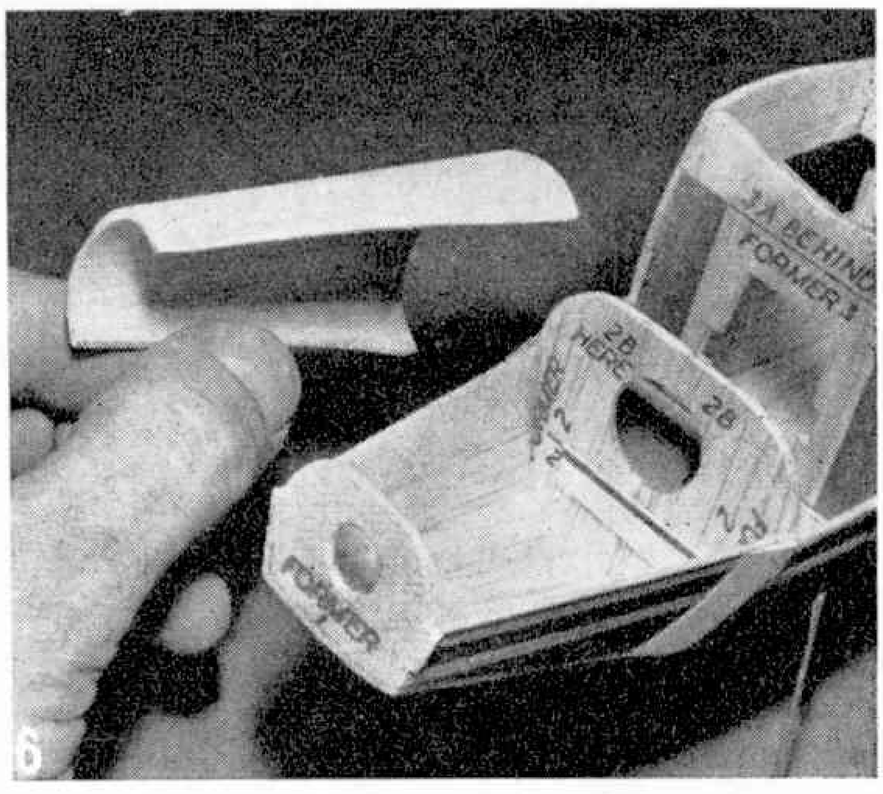


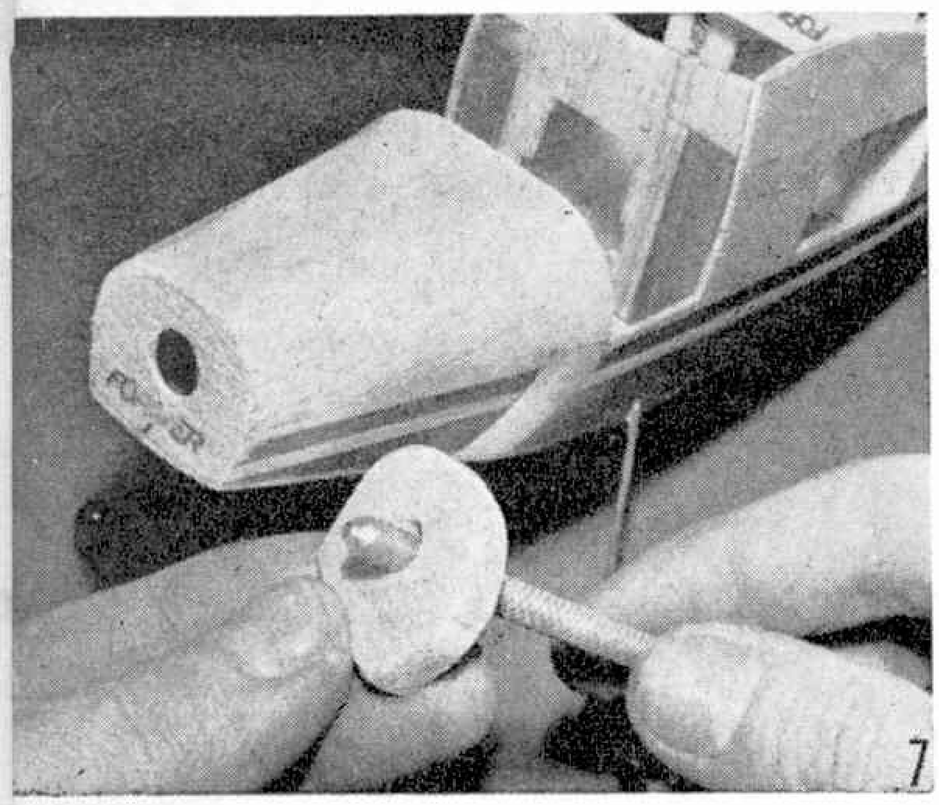


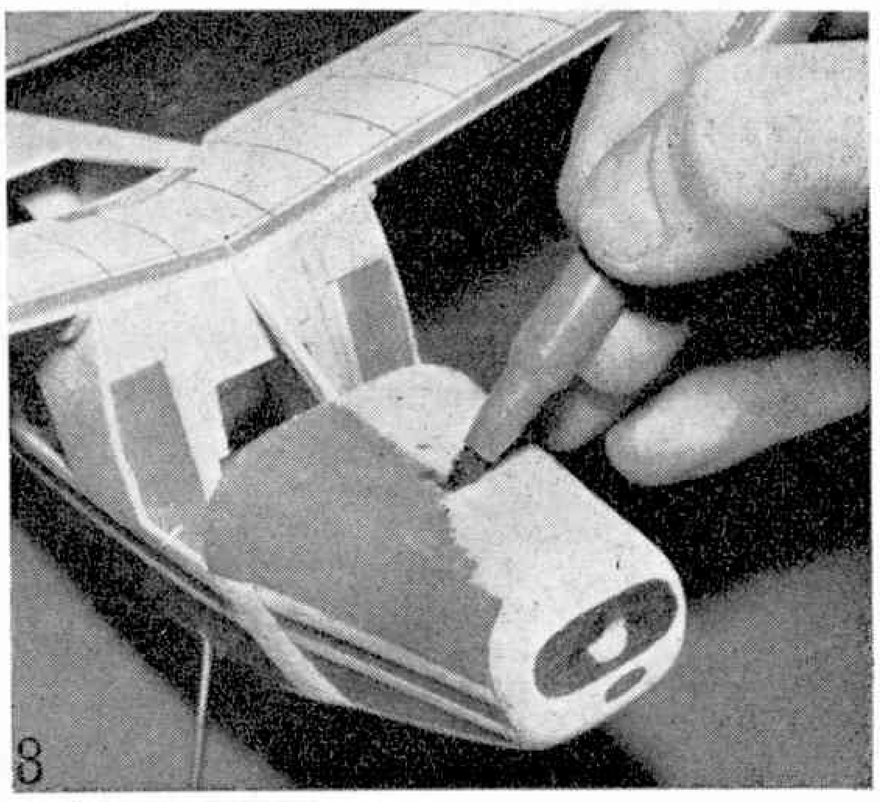












1 & 2. After cementing the engine cowling sides to the main fuselage sides, and ensuring that both assembled sides are exactly the same length, the centre cabin formers are cemented in place and held with pins. Be very careful to keep everything 'square' and allow the balsa cement to dry before doing anything else to the fuselage. In some kits former 4 (indicated) is cut without the necessary taper at the sides. It is a very simple matter to correct this with the sandpaper included in the kit. The finished job should look like the lower one in photo 2. Check the kit as you go.

3. When the cement has dried, the two rear ends of the fuselage sides are drawn together and, with the rear former 7 in place, cemented and pinned. Be sure the sides taper evenly towards the tail. Now you can position former 6, locating the little side tongues in the ready-cut slots in the fuselage sides. Besides the curve from front to rear, each fuselage side follows a gentle curve from top to bottom. If you have difficulty in bending the wood, don't force it, but moisten the *outside* with the fingertip and the wood will bend all by itself! Notice how cleanly the parts come out of the balsa sheets. Only remove them as you need them and in this way you won't lose any!

4. The undercarriage wire is supplied bent as a 'V'. It must be opened out slightly and two more bends put in it follow the shape of the groove formed between formers U1 and U2. The wire is easily bent with pliers. The photo shows the undercarriage as supplied (lower) and correctly bent (upper).

5. Use lots of balsa cement to fix the undercarriage, and finally box it in with former U3 holding the whole assembly together with pins until quite dry.

6. The coloured cowling-top in the kit is ready-scored to simplify bending it to shape, but if you have a spare piece of soft $\frac{1}{16}$ in. balsa sheet around, why not try making the cowling in the real professional way? Cut the wood to shape (using the kit piece as a pattern) and holding it in the steam from a boiling kettle (very close to the spout) you will be able to bend the wood quite sharply. When it's cool, it will keep its shape like the piece shown in our picture. The advantage of this method is that you end up with a nice smooth cowling and the steaming technique is useful for future, more advanced model projects. Steaming is not so successful with the scored cowling supplied in the kit since the scores will split the wood.

7. Here's the cowling in place and neatly sanded to blend in with the rest of the fuselage. The nose block must have a $\frac{1}{4}$ inch diameter hole made for the plastic propeller shaft bearing and this can best be done by cutting or drilling a small hole first and then opening it out to exact size with a round file or rolled-up sandpaper.

8. Once cemented in place, the corners of the noseblock are then rounded off. Never use paint or dope on the wood parts of these small models since the porous wood soaks up so much, that the model will then be far too heavy to fly properly. Felt-tipped pens are ideal for colouring balsa and a red one will match the Dornier 27 colour printing perfectly. Use a black pen for the front noseblock markings.

Look closely at the photo of our finished model and you'll see lots of little improvements we've made to our Dornier. The nose stripe pattern is carried right round the noseblock and over the tapered side just ahead of the windscreen using the red felt pen. The same pen is also used to colour the front (leading) edge of the wing and tail. A black felt tip pen has been used to draw on engine cowling lines, blacken the former 3 (behind the windscreen), colour the tailwheel tyre and the little window on top of the wing centre section. The clear acetate cabin windows and windscreen are edged with silver. Plastic wheels are usually very

continued on page 38

AIRCRAFT KITS

MITSUIBISHI Ki-109 Experimental Interceptor Fighter, 1/72nd by L.S. Laboratories 24/11

MITSUIBISHI Ki-67 Navy Torpedo Bomber, 1/72nd by L.S. Laboratories 24/11

HIRYU Army Heavy Bomber, Peggy, 1/72nd by L.S. Laboratories 24/11

HELLER 1/72nd
Bloch 152 5/11
Bloch 174 15/11
Curtiss 75-A3 5/11
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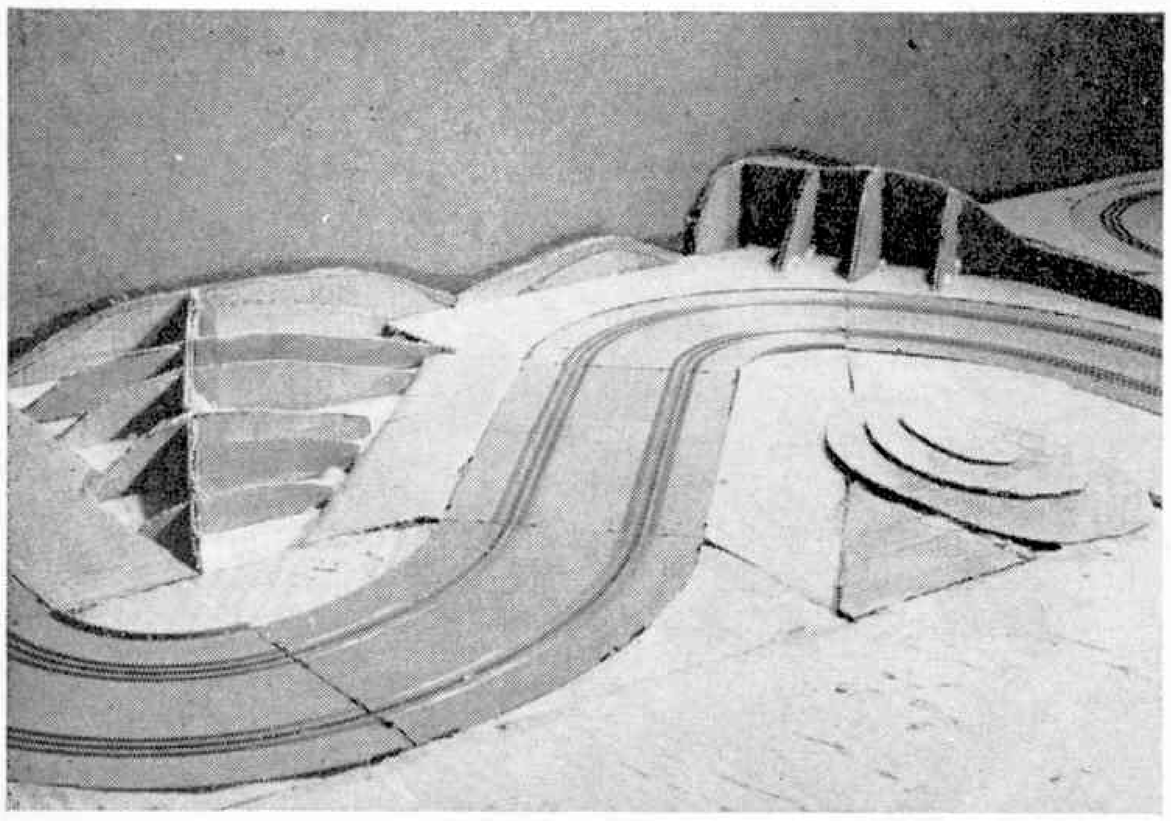
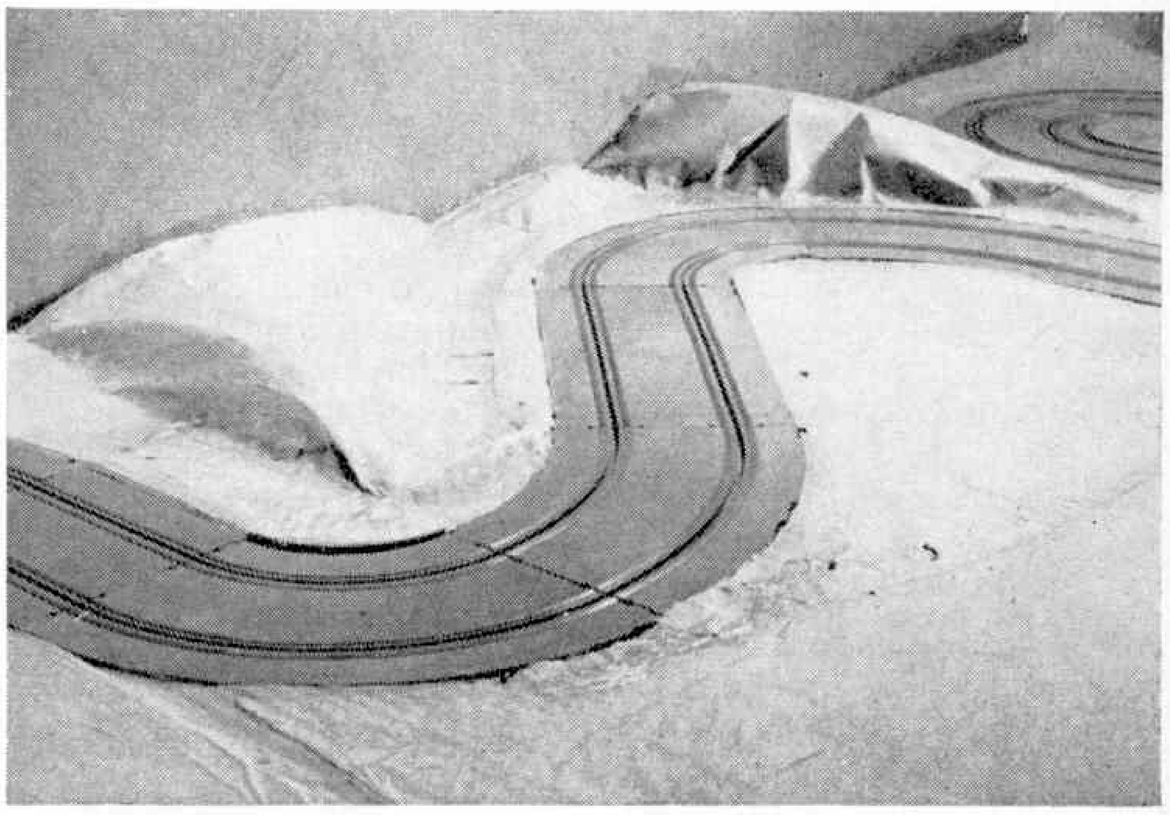
Building a Permanent Circuit - Part 3

Godfrey Arnold continues building his slot race circuit and this month the scenery begins to take shape. M.M. readers are constantly requesting articles on scenic work and there are innumerable ways of tackling the job, Godfrey's system is one of the cheapest and yet it is highly effective.





These two views illustrate how the hills are built up. From the hill on the right it will be seen that few ribs are required where there is a steep drop. Note also how the cardboard is put on the large, flat areas in small, easy to manage pieces, the small rise on the inside of the circuit and the very small hill in the centre that only warrants two ribs (below)

LAST month I said that you would be needing a supply of corrugated cardboard, and if this is at hand then making the scenery can start.

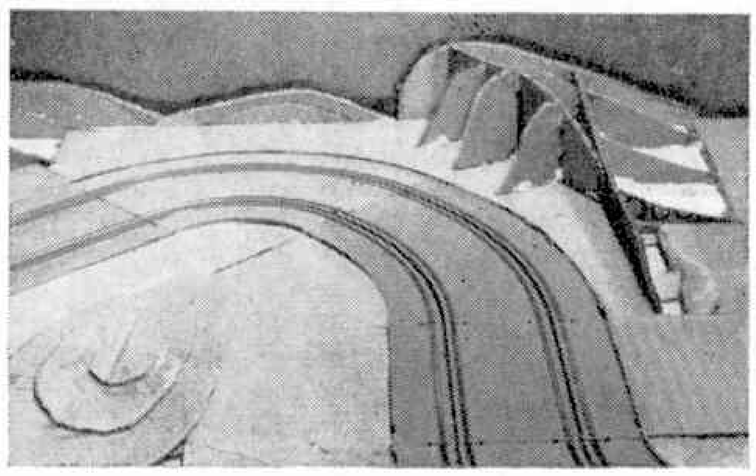
When the track is laid on the baseboard it stands proud by over a quarter of an inch. Whilst this would be in order on a model railway layout, roads, especially on racing circuits, are rarely raised above the level of the surroundings and this means that we have either to lower the road or raise the 'ground'; in this case raising the ground is much easier.

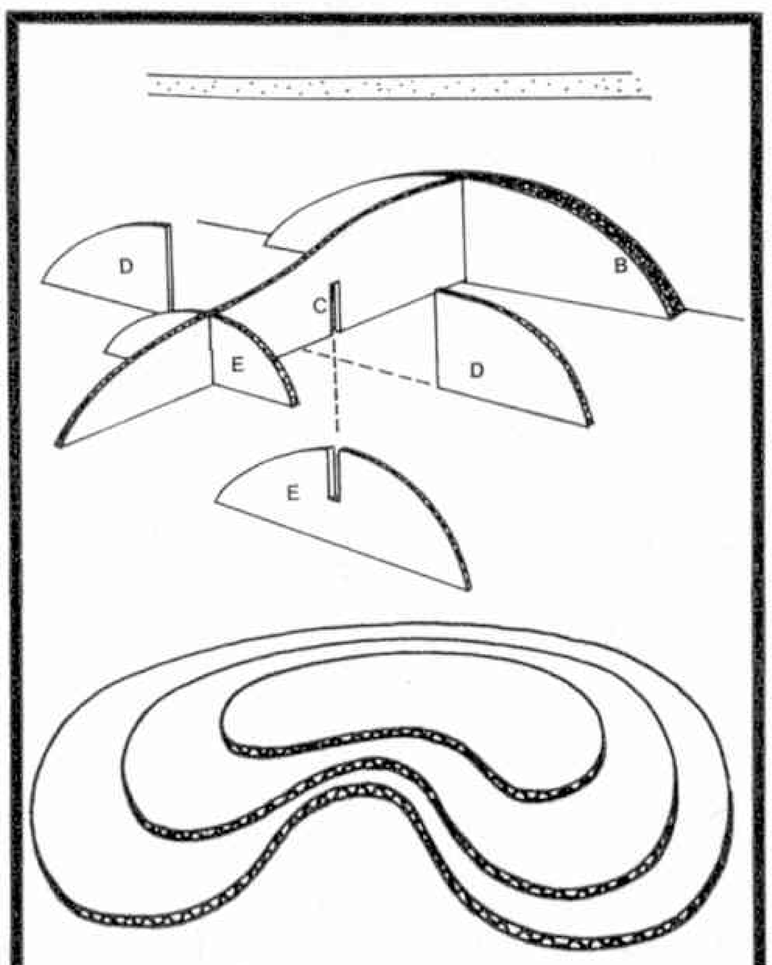
Before raising the level of the track surrounds a rough idea of the final topography of the circuit is a help and when deciding this a few things have to be taken into account. Certain basic features are important in a miniature circuit and, for realism, pits are essential. Because it would be impossible to get a scale sized circuit into a reasonable space we find that pits take up most of the main straight; this looking far more realistic than one short pit building taking up a proportionally correct amount of straight. This will, of course, mean that a flat area has to be provided for the pits and the approach and service roads and this, in turn, means that almost half the layout must be flat.

A couple of slopes are forced upon us by the socket panels and power unit housing, although these could be disguised as buildings, but, apart from this, we are free to fit slopes in with the background if we want to. In practice, this means that any hills should level off before meeting the background so that the join looks like the highest point.

There are many ways of building up landscapes but most of them are rather messy so that, in this case, paper and cardboard are used, this being one of the cleanest methods.

The first stage is to bring the track surrounds flush with the track itself. Two layers of corrugated cardboard of the usual thickness, three if it is very thin, are cut to shape and stuck down with Copydex, small areas being done at a time and surplus track parts, if available, being used as templates. It is necessary to cut out small pieces of the cardboard to allow for lugs in the track and other such projections.





A—backboard. B—rib from four layers of corrugated cardboard. C—spar. D—other ribs stuck each side. E— two ribs notched into spar

Once all the track surrounds and flat areas are filled in the slopes can be built up. These are made in a similar manner to the wings of flying model aircraft but corrugated cardboard is used instead of balsa wood. As the slopes run right up to the background the first step is to make up a thick 'rib' to fit on the backboard onto which the paper that forms the surface can be fixed. Three or four thicknesses of cardboard are needed here and should be the shape of the end of the hill. The main 'spar' should then be cut out and a couple of ribs notched into it, Copydex again being used as an adhesive. Further ribs can then be added, so that there will be no point on the surface more than an inch from a support, and these can be made in two parts, one for each side of the spar. The socket panels should be treated in a similar way and all supporting structures should be allowed ample drying time before further work is carried out. Small rises can be made simply by adding a couple of layers of cardboard.

The whole area of the circuit, except for the track itself, can now be covered with thick paper. An ideal material for this is to be found in paper sacks of the type that potatoes are delivered in, ordinary brown paper not being rigid enough. The paper should be stuck with Copydex wherever possible, any wrinkles being either smoothed down or lapped over and stuck down. Any gaps between the track and its surrounds can be filled with Humbrol Plastic Wood and the scenery can be added, but this will have to wait until next month. The best way, for most of us, of making the background is to use those provided by Peco and for this track the following are used: Two each of SK 11 and SK 12, one each of SK 13 and SK 14.

Note: In the first article in this series, it was not mentioned that SRM track can be fixed to the baseboard by special clips available for the purpose. Other makes of track will have to be fixed by one of the methods shown in part 1.

the story of picture cards

by James Hendrik Witte, with illustrations from the author's collection

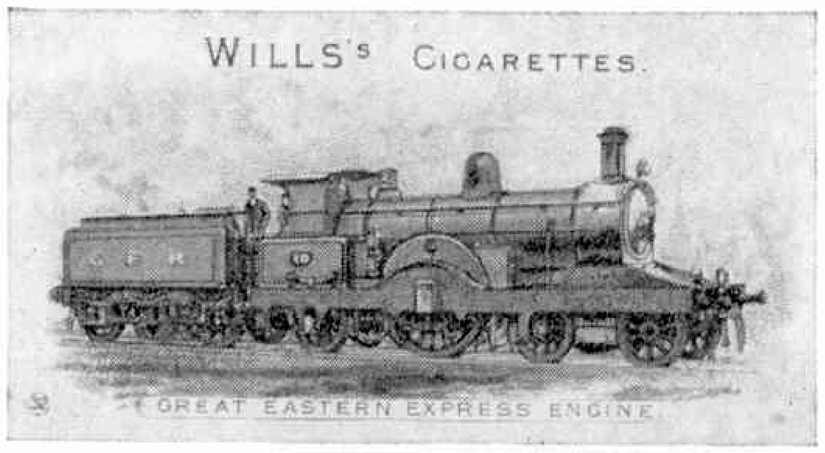
I WAS a boy when splendid steam locomotives in bright liveries thundered along the tracks, when trams clattered and swayed through the streets of London and when hard-tyred, open-topped buses rumbled around Piccadilly Circus. Today, however, the steam locomotives are fast disappearing, their places taken by diesel units and the exceptionally fast diesel-electrics. The trams have long since gone, except along the front at Blackpool, and on the Isle of Man, where sturdy horses pull them during the summer months.

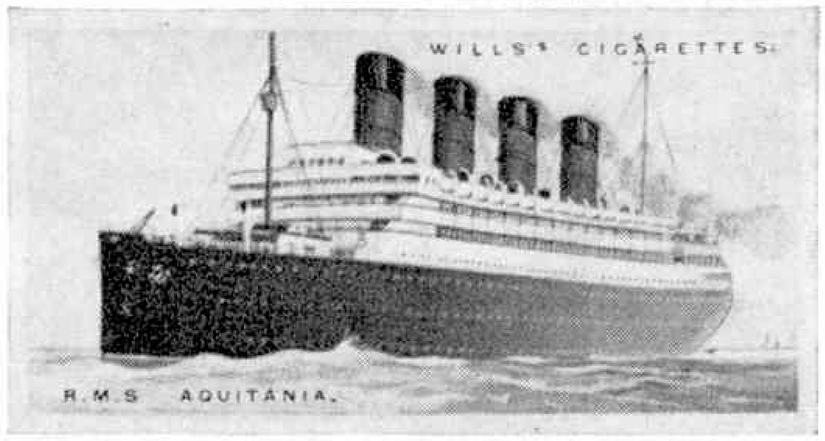
In my boyhood days there was no such thing as television, and in a good many homes there was not even a radio set. The range of toys, too, was not so great as it is today. Many parents could not afford to buy their children expensive presents, which meant to say that a lot of boys had to make their own amusements. One of them was collecting cigarette cards, a simple but absorbing pastime which cost relatively nothing. Cards were collected for two reasons mainly, firstly to build up a collection and, secondly, to play a game called 'Flickems' with a variation known as 'Knocksy Downseys'. All you needed for the latter was a brick wall and a pack of cigarette cards. As far as 'Knocksy Downseys' was concerned, it was played between two boys who each set up between them a dozen cards along the bottom of the wall. The object of the game was to flick cards at them and knock them all down; the winner was the boy who knocked the last card down and collected all that lay on the ground.

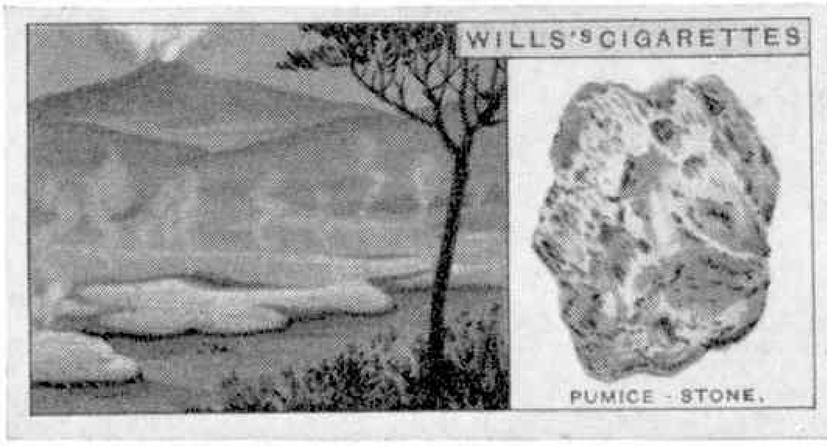
The true schoolboy collector of my day would never have dreamed of buying cards for his collection unless, of course, someone gave him a little money for Christmas or a birthday. Cards had to be found, and that meant looking for them in discarded cigarette packets, asking adults in the street and by swapping little treasures like marbles, comics and old penknives. It sometimes happened that several of us were collecting the same set; it then became a point of honour almost, to see who could finish first, and it was always a triumphant moment when you could announce that you had got 'number 45' and were ready to start collecting the next set.

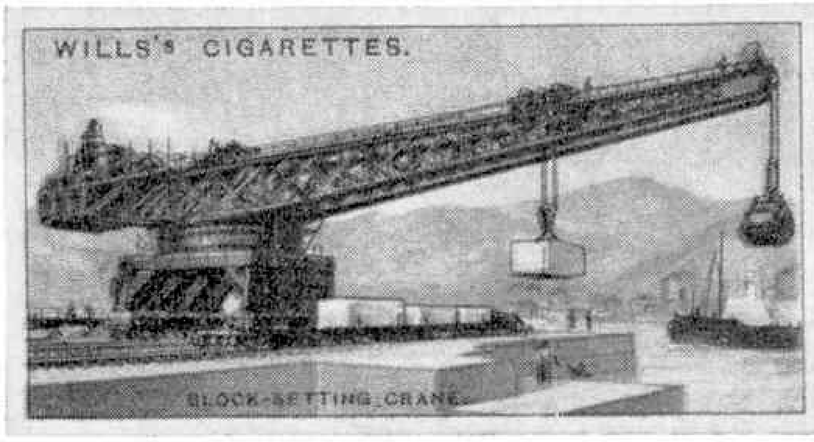
No one quite knows why the tobacco companies decided to put cigarette cards into packets, except that eighty years ago the packets were flimsy affairs which needed stiffening to prevent cigarettes from being crushed. The first cards were known as 'stiffeners' and were completely blank. As the years went by illustrations were added and text to the reverse sides of the cards. From about 1888 to 1939, the outbreak of the Second World War, there were billions of cards issued mainly in sets of 25 and 50. Manufacturers had to have printed something like a million cards for one issue alone, which quite possibly would have been in circulation for two months or so.

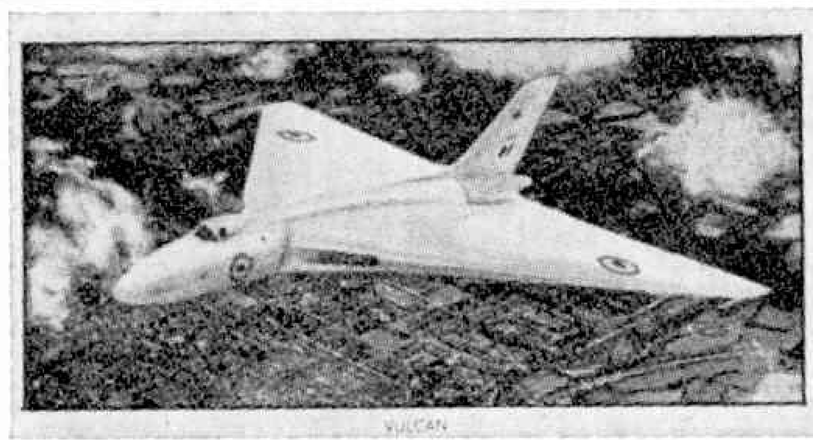
The scope and variety of the sets issued between the two wars was wide indeed and each particular set formed a miniature reference library on a particular subject. There were cards dealing with railways, ships, motor cars, aeroplanes, soldiers, sailors, engineering, the cinema, sport, flags and emblems, gardening, animals, to name but a few. They were all very well produced and the text factual and informative.

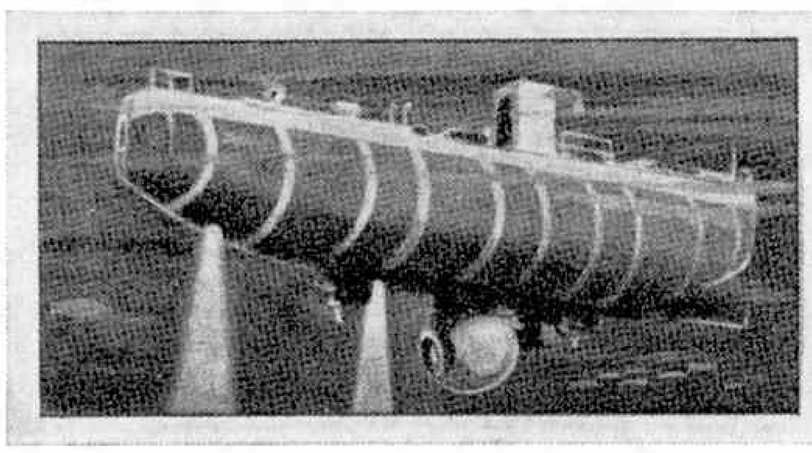












Unfortunately, cigarette cards as such were discontinued when the Second World War came. They never returned, although there are many millions still in circulation amongst collectors. The cards of today, are called trade cards or picture cards to distinguish them from pre-war cards. These are issued by many tea firms, sweet manufacturers and a number of concerns in the food industry. Like the pre-war cards they, too, have great scope and an ability to impart information on many subjects from space exploration to reptiles. Such cards can be bought quite cheaply from dealers at prices ranging approximately from 1s. 6d. to 5s. a set. Pre-war sets are a different proposition, however, many sets can be bought for a few shillings, but on the other hand others can cost several pounds.

If, after having read this article, you feel that you would like to start the fascinating hobby of 'Cartophily', my advice is to join a cigarette card club. The Cartophilic Society of Great Britain is by far the best, because it has a junior section and people in it who feel the need to encourage the hobby amongst youngsters. Every two months it holds a postal auction when many good items are offered, and when it is often possible to bid and secure cards for a few shillings. There are also three big dealers in the business, the London Cigarette Card Company, the Britannia Cigarette Card Company and the Universal Cigarette Card Company who are always ready to help and guide newcomers in a rapidly growing and absorbing hobby.

Top to bottom:

1. This set of 50 cards issued by Wills in 1900 was the first-ever set on railway engines in Britain, if not the world. The card shows a Great Eastern express locomotive in the livery of 1900

2. No. 11 of a set issued by Wills in 1924 called 'Merchant Ships of the World'. There are 50 in the set, and the card illustrated depicts the RMS 'Aquitania', once described as 'the wonder ship of the world' but long since broken up

3. Another set from the 200 or so issued by Wills between 1895 and 1939. This card is from a series called 'Do You Know?' issued in 1926. The question is 'What is pumice stone?' And the answer—'a froth-like and porous volcanic glass used commercially as an abrasive'

4. No. 32 of a set issued by Wills in 1927 called 'Engineering Wonders'. There are 50 cards in this set, and the one shown deals with an aspect of harbour building. The crane is a Titan, similar to those used in shipyards today

5. This card is from a modern set issued with 'Knockout' in 1956. It shows the Avro Vulcan, the first four-jet bomber to have a delta-wing shape. The plane first flew in August 1952. There are 20 cards in this set

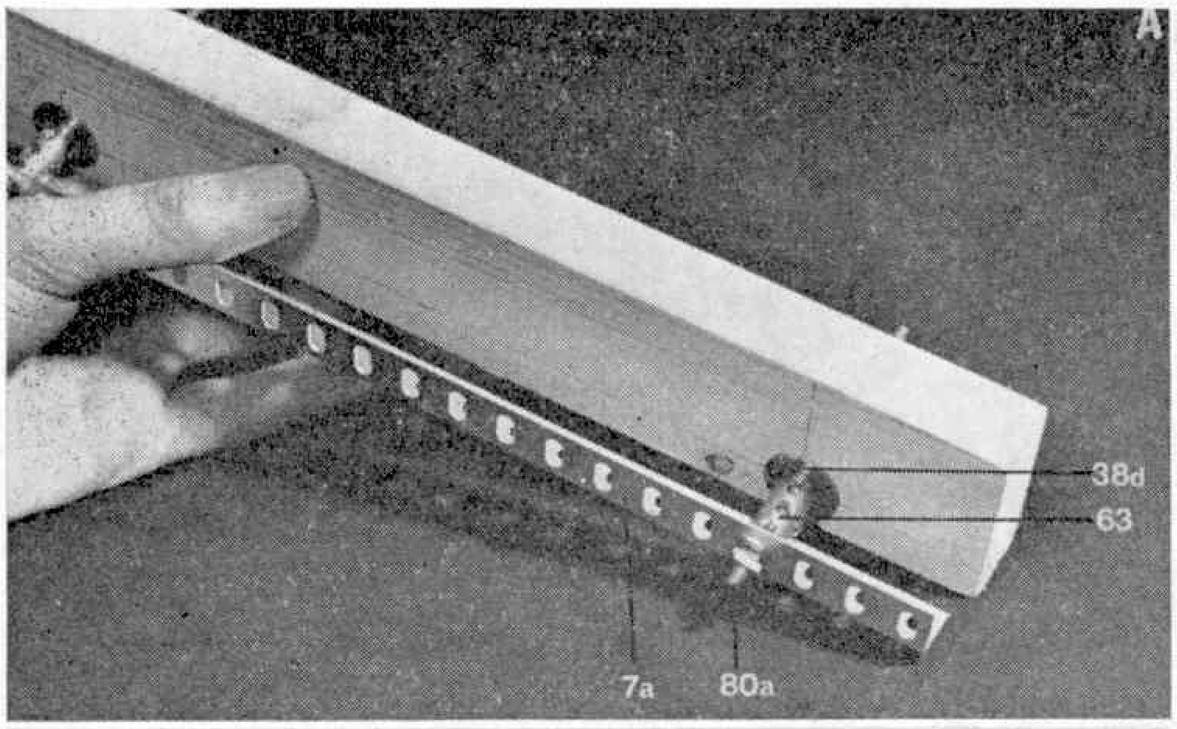
6. Another modern card from a series of 25 issued in 1963 by the Tonibell Ice Cream Company, called 'Inventions that Changed the World'. This card shows a 'Bathyscaphe', a craft for exploring the depths of the sea

Building Banthorn-3-The Traverser

by Mike Rickett

In last month's article, we dealt with the woodwork involved in the construction of the two station baseboards and their hinge joints. Those of you who have followed the series so far will now be ready to build the remaining baseboard section for the traverser and also the four sets of legs needed to support the layout.

A



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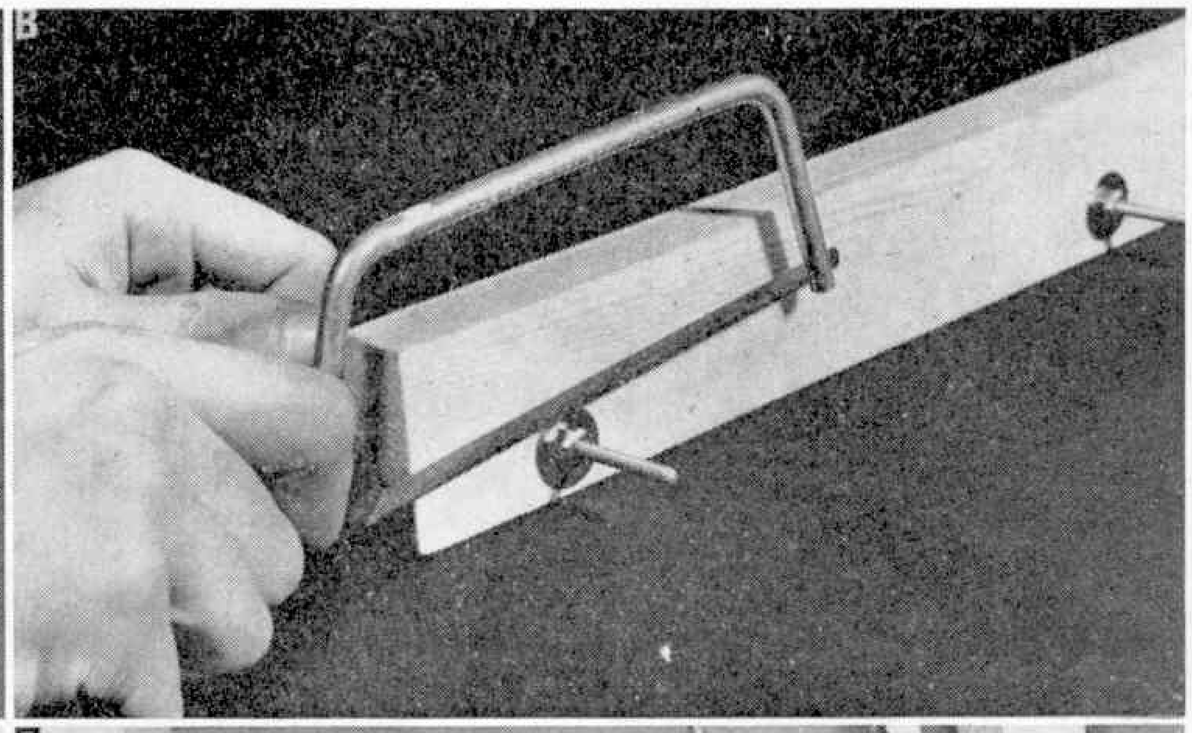

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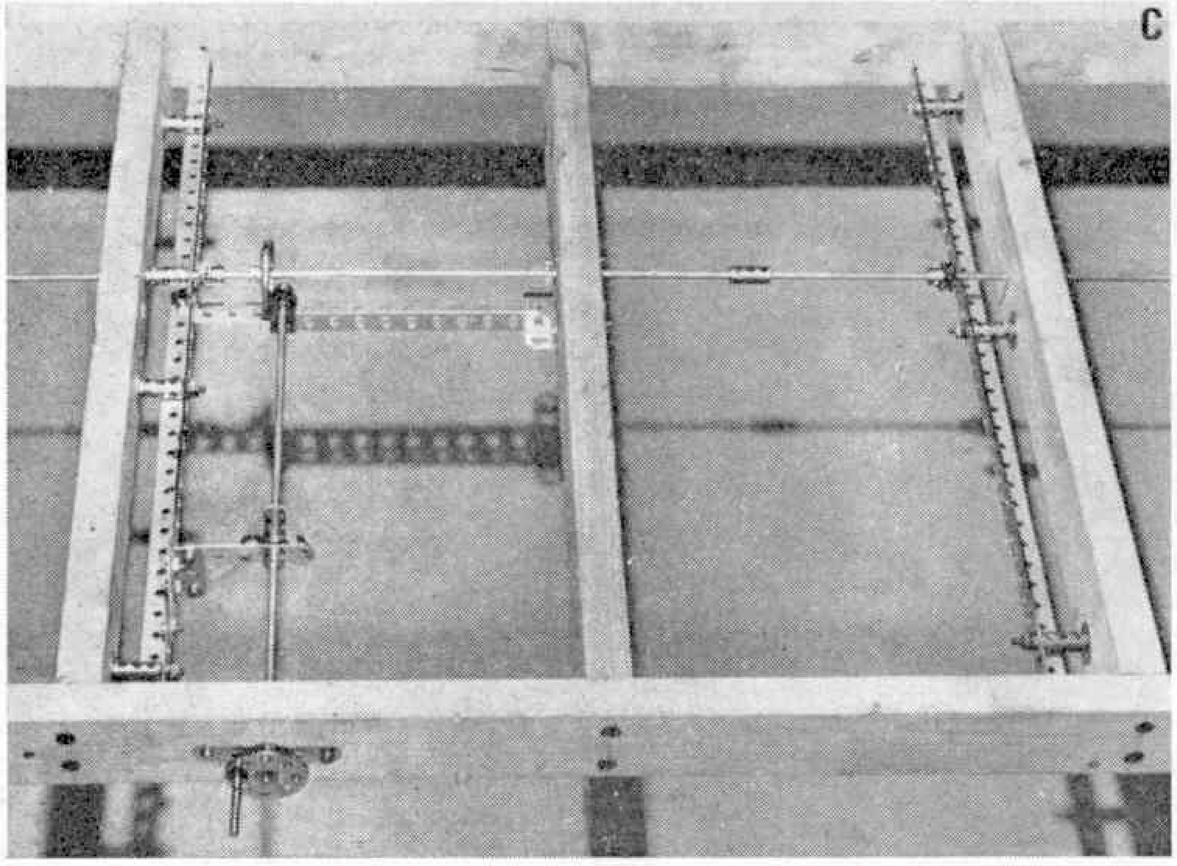

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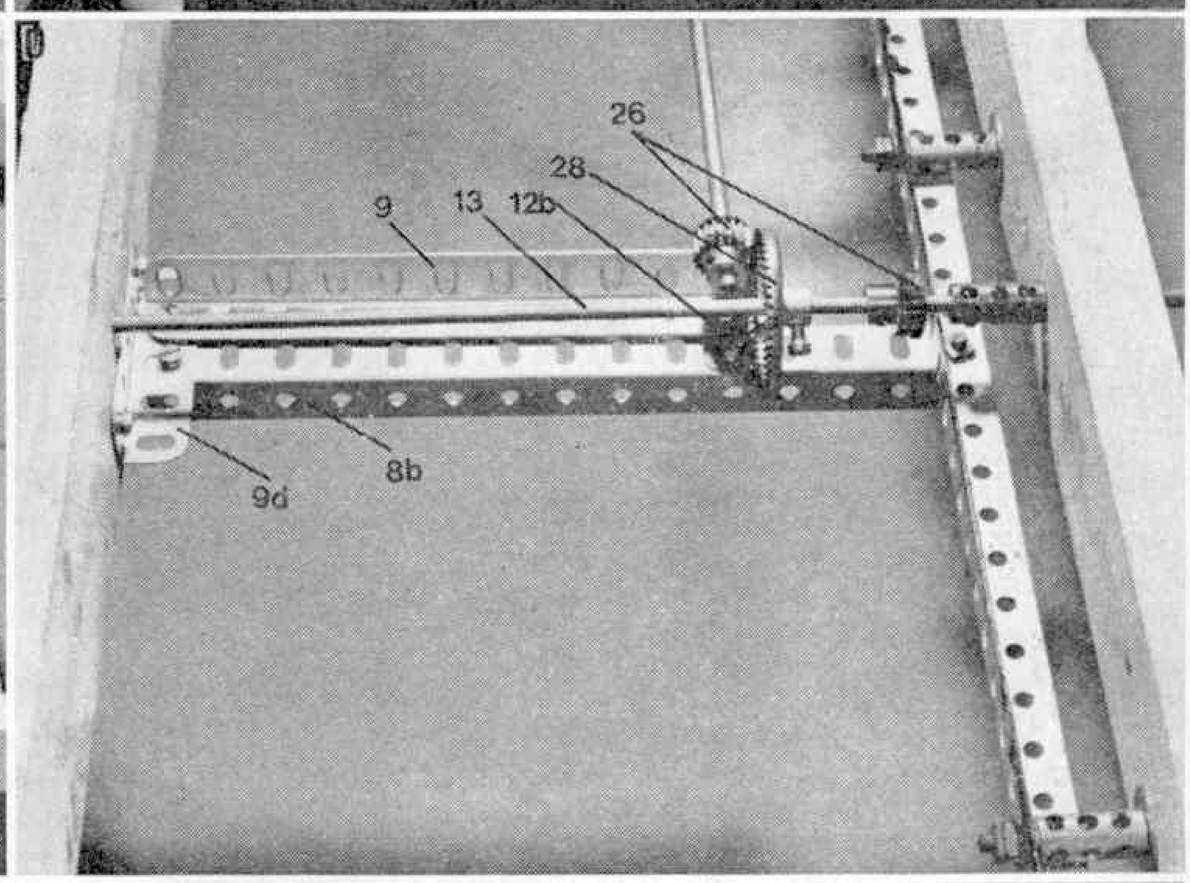

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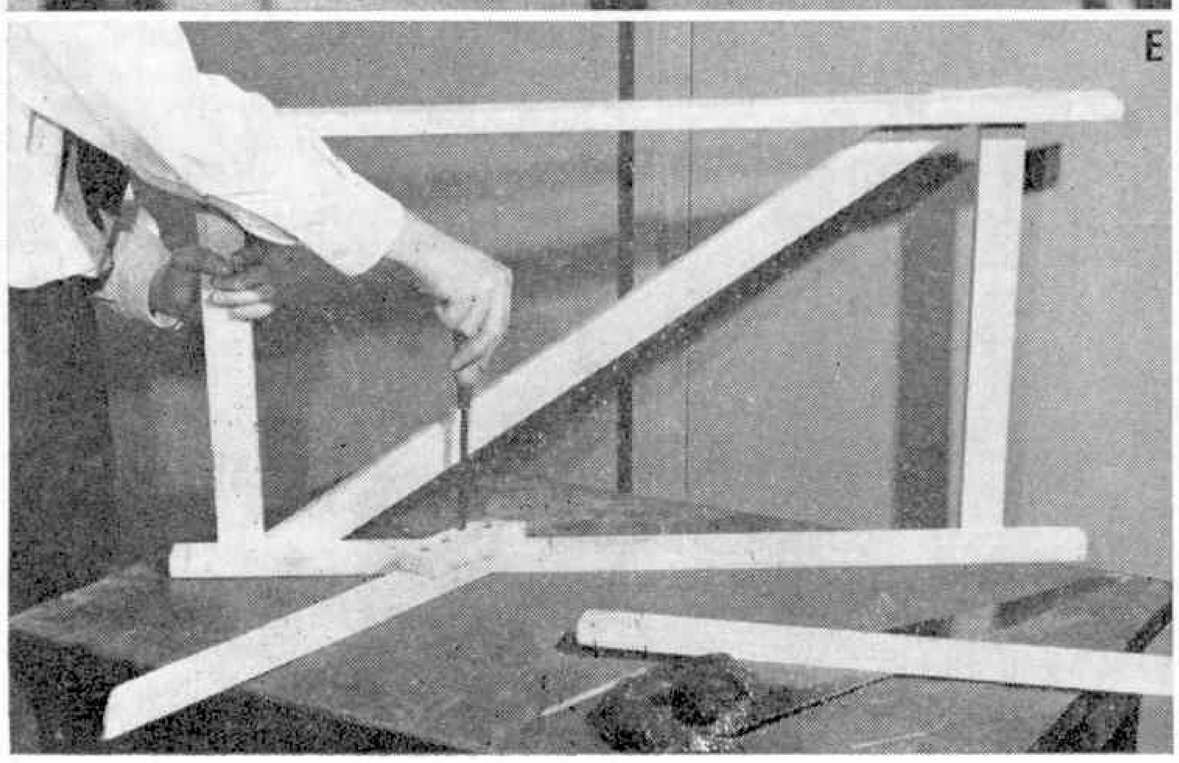

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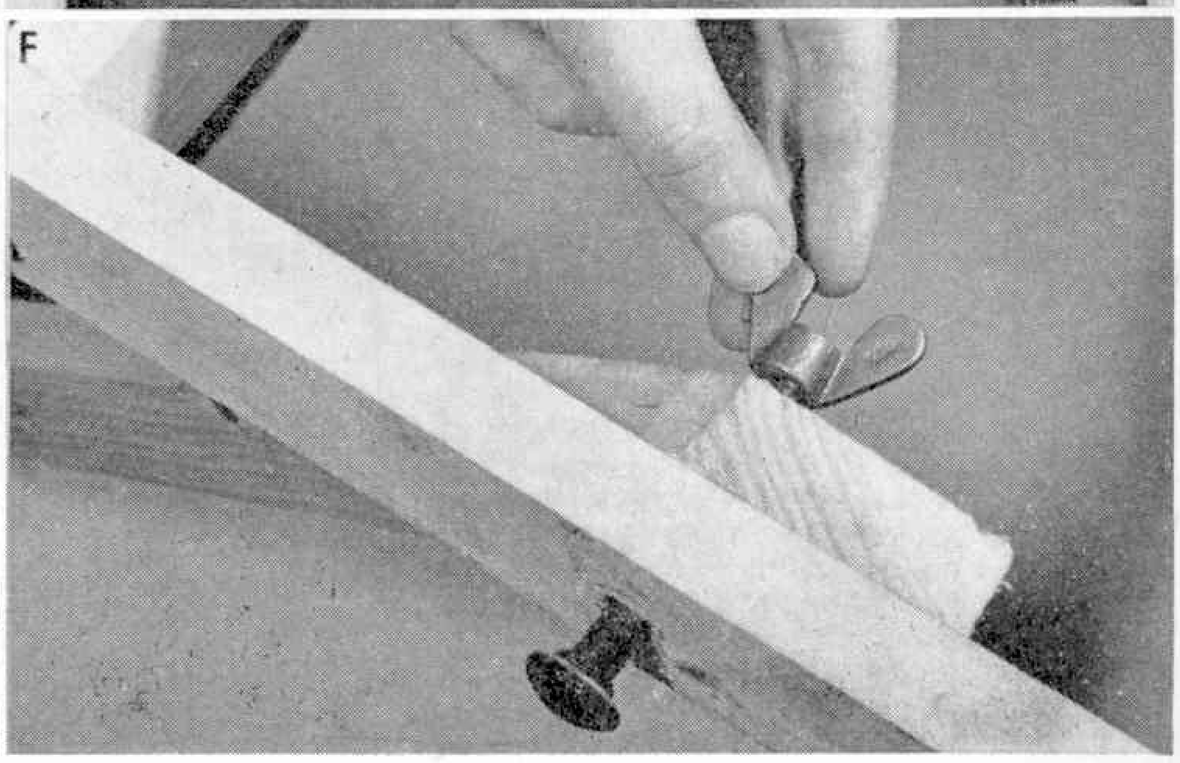
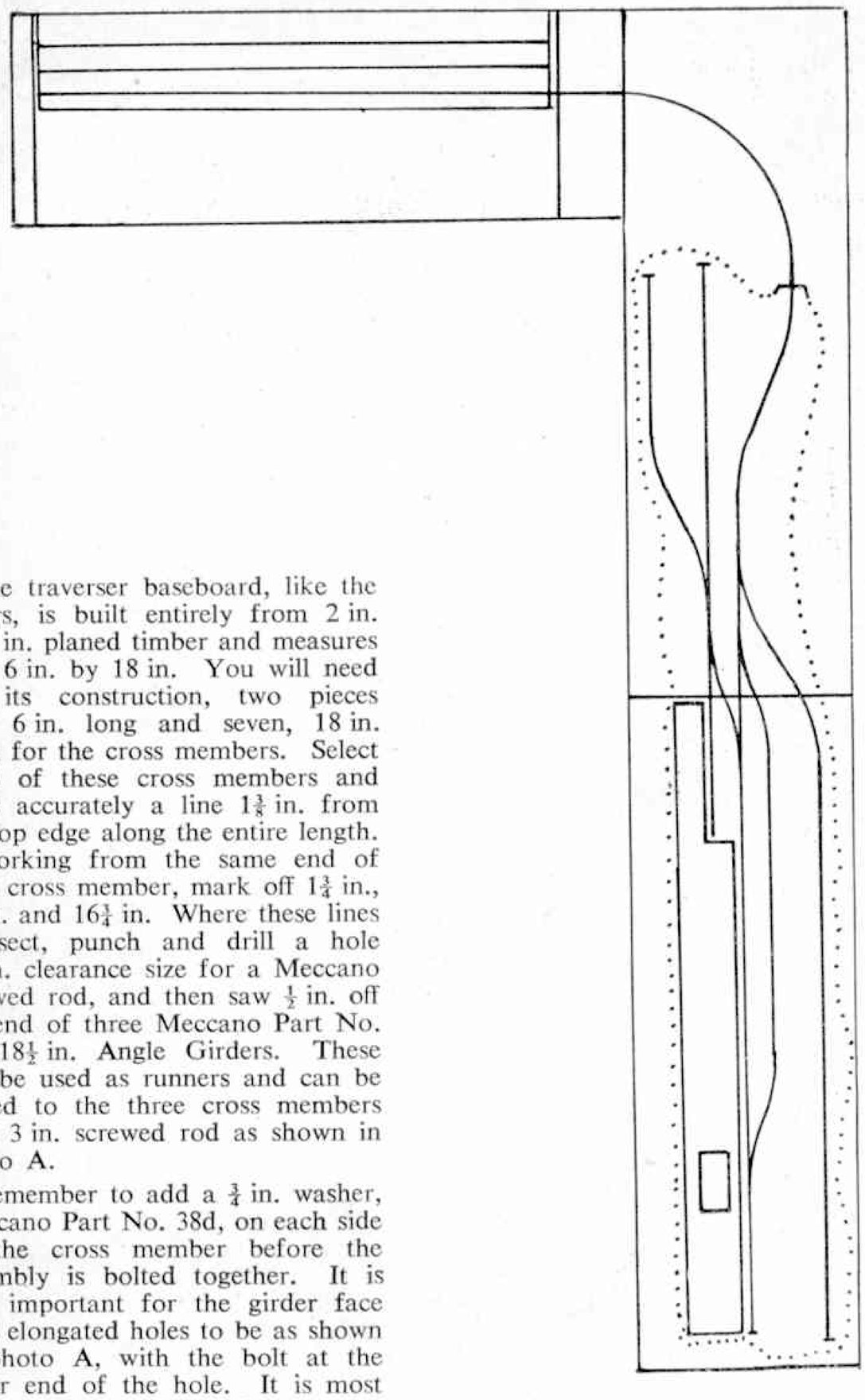




The traverser baseboard, like the others, is built entirely from 2 in. by 1 in. planed timber and measures 4 ft. 6 in. by 18 in. You will need for its construction, two pieces 4 ft. 6 in. long and seven, 18 in. long, for the cross members. Select three of these cross members and draw accurately a line $1\frac{3}{8}$ in. from the top edge along the entire length.

Working from the same end of each cross member, mark off $1\frac{3}{4}$ in., $9\frac{3}{4}$ in. and $16\frac{3}{4}$ in. Where these lines intersect, punch and drill a hole $\frac{6}{32}$ in. clearance size for a Meccano screwed rod, and then saw $\frac{1}{2}$ in. off the end of three Meccano Part No. 7a, $18\frac{1}{2}$ in. Angle Girders. These will be used as runners and can be bolted to the three cross members with 3 in. screwed rod as shown in Photo A.

Remember to add a $\frac{3}{4}$ in. washer, Meccano Part No. 38d, on each side of the cross member before the assembly is bolted together. It is also important for the girder face with elongated holes to be as shown in photo A, with the bolt at the lower end of the hole. It is most important for the girders to be parallel with the surface of the baseboard and for them to be fixed firmly in position. You are therefore well advised to locknut at all times. Saw off any surplus bolt flush with the locknut, as shown in photo B, and if the end of the girders should protrude slightly beyond the end of the timber, file this off flush.

Before the various components of the traverser baseboard are screwed and glued together, you will find it convenient to drill a hole through all but the end cross members. These are for the shaft that will eventually run almost the length of the traverser baseboard. They must be drilled accurately and must be at right angles both horizontally and vertically if the centre shaft is to run freely with the minimum of friction.

Photo C shows a general arrangement of the mechanism and you will note how the shaft runs straight through the three cross members shown in the photo. This shaft is positioned approximately $\frac{7}{8}$ in. by 1 in. down and 11 in. from the end of each cross-member. You can see in photo D, a close-up of the shaft where it engages with the Pinion Wheel connecting the handle that moves the traverser. On the left of the two gears in this photo, attached to the adjacent cross member, is a 2 in. Angle Girder which is bolted to the cross member at exactly the same height as the runners and you should drill two holes $1\frac{3}{8}$ in. down and approximately 1 in. to either side of the hole for the centre shaft. Use the actual piece of Meccano to give the exact position of the holes.

The nine components of the baseboard can now be placed in their approximate position for glueing and screwing together. I would suggest that they all be laid on the floor with the cross members positioned at approximately 9 in. intervals. Make sure that the three cross members with runners are the correct way round and in positions 2, 4, and 6 from the leg end of the baseboard. Runners 2 and 4 should all face away from this end of the baseboard and member 6, towards it. Mark all joints on the two side members and then screw and glue as described last month.

A convenient baseboard height will, of course, vary from person to person, although we have found 3 ft. to be a good average and the measurements given here are therefore for this height.

Once the legs are cut to the length required, they should be laid edgeways on over a flat surface and marked off along one end to $1\frac{3}{4}$ in. or whatever the depth of the 2 in. by 1 in. timber is when planed. Rule a line across the edge of both legs and at the opposite end, rule a second line 3 ins. up. Lay two pieces of 2 in. by 1 in. timber 1 ft. 6 in. long across these two lines with both pieces on the inside of the line. Do not, as yet, screw or glue, but take a piece of timber approximately 1 ft. 9 in. long and lay this diagonally across the two legs in between the two spacing pieces. Mark off the end of this diagonal piece so that it fits snugly on the spacer and flush with the side of the leg (see photo E). Drill a hole through one of the cross spacers, spread glue between the joint and then countersink and screw together. Repeat for the other three joints, inserting one screw only in each joint. The diagonal piece should not be screwed up until the legs have been tested for squareness, which is done by leaning them next to a table leg, or indeed anything that is upright. If the legs have any tendency to lean either to the right or left, this can be corrected quite simply by tapping gently until square.

When you are satisfied, lay the legs down flat once again and screw on the diagonal piece, adding only one screw in each joint. Test for squareness once again and drill and countersink holes for the second screw in each joint. Allow the legs to dry and lay the baseboard section on its side so that one pair of legs can be fitted to the end of the baseboard. You will have noticed from our drawings and photographs that the legs have a further diagonal strengthening piece attached to the baseboard side member. The length of this member is judged by laying a piece of wood in position, with the baseboard and legs attached to each other. The diagonal piece should be positioned approximately 12 in. from the top of the legs and 12 in. along the baseboard side member from one end of the baseboard. When you are satisfied with its position, mark off on both the diagonal piece and also on the inside edge of the baseboard legs, and then saw to shape.

Since the diagonal piece has to be butt-jointed to the edge of the leg, we have found it easier to fit a 6 in. long piece of 2 in. by 1 in. timber behind both legs and diagonal pieces, rather than to indulge in any complicated joinery. Two holes should therefore be drilled in the leg and two in the diagonal, with the block glued and screwed to both of these. As shown in photo F, the top of the diagonal should fit behind the baseboard side member so that they can be bolted together and so help strengthen the baseboard. It is also important that it does not protrude above the top of the side member because this will make the fitting of the baseboard surface more difficult.

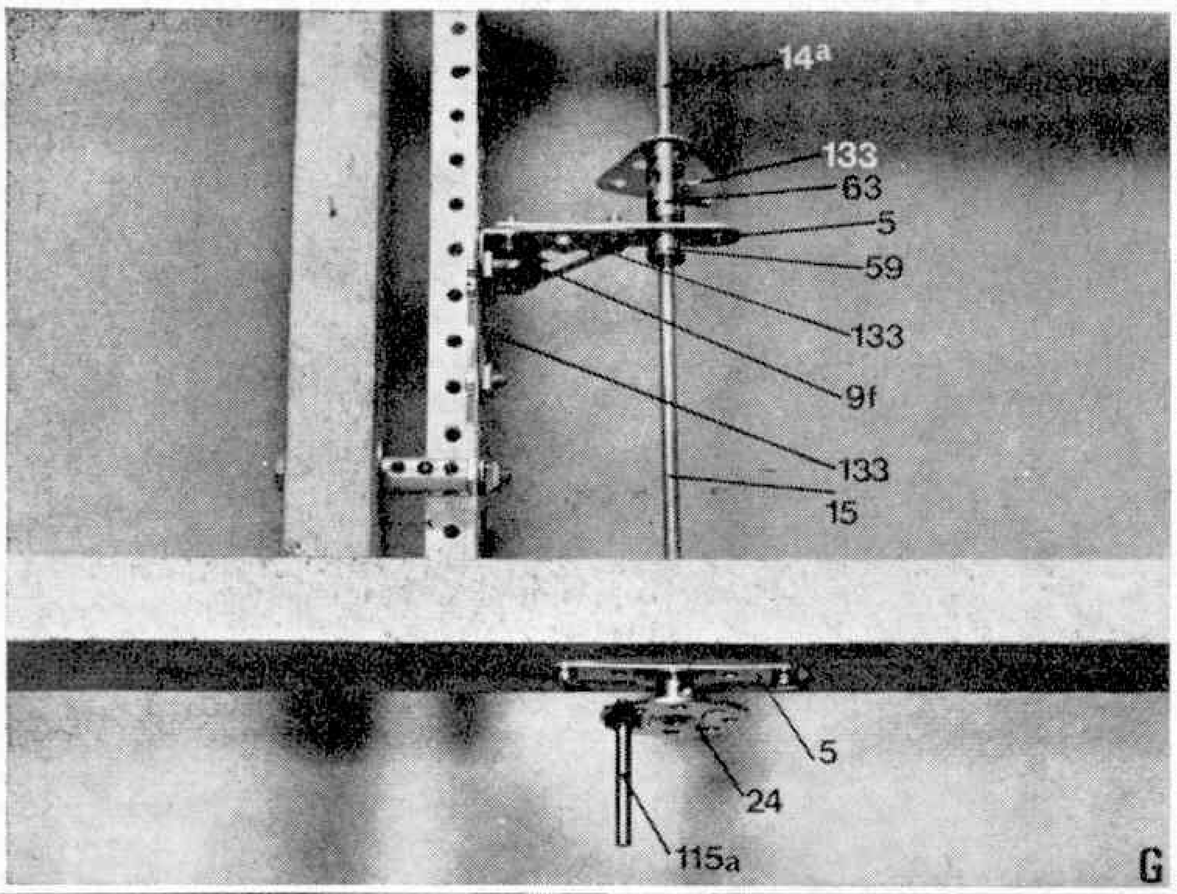
Four pairs of legs will be required, three for the station and one for the traverser baseboard. The hinges, which are 2 in. by 1 in. steel, are screwed to the top of the blocks once both station baseboards have been built as described last month.

Once all four sets of legs have been built, each one for a particular position, it is wise to make a distinguishing mark on all the legs, with a corresponding mark on the baseboard to show its position. To fit the legs, drill two $\frac{3}{8}$ in. holes at the end of each side-member on both the traverser baseboard and on the two station baseboards. Note that one of the two station baseboards will require holes at both ends since this has two sets of legs. These holes should be positioned approximately $1\frac{7}{8}$ in. from the end of the side member in each case and must be drilled as level as possible. Repeat this process for each set of legs, then use $2\frac{1}{2}$ in. long coach bolts and wing nuts to attach the legs to the side members. The next step is to drill two more holes in the baseboard side-members for the diagonal strengthening pieces. The tops of these diagonal pieces must not protrude above the baseboard but should, if possible, lie flush with the tops of the side members, as shown in photo F.

One end of the traverser baseboard has to be joined to the side of the station baseboard and two $\frac{3}{8}$ in. holes must be drilled in the end member of the traverser baseboard and the side member of the station baseboard. These two holes should be drilled about 6 in. and $17\frac{1}{2}$ in. from the end of this baseboard with, of course, corresponding holes in the traverser baseboard. The two can then be secured with two $2\frac{1}{2}$ in. coach bolts, wing nutted and with the heads of the bolts on the inside of the main baseboard.

Once the three sections of the layout stand on their own legs, and are bolted together, you can begin fitting the Meccano mechanism into the traverser. The first step is to fit the shaft along the centre of the traverser baseboard, for which holes should have already been drilled in the five cross-members. The shaft rodding consists of four $11\frac{1}{2}$ in. Axle Rods, Meccano Part No. 13, which are joined as you can see in photo C by three couplings, Part No. 63. The most important of these joints is the one where the coupling lies between the runner edge and the baseboard cross-member, and I would suggest that you work from this joint if at all possible. You may also find it convenient or necessary to drill a hole in the end cross-member of the traverser baseboard so that the four shaft rods can be located in the holes drilled for them in the cross members.

You will see from photo D, the construction of the assembly between the runner and the adjacent cross member. Only one of these is required and it should be bolted into position as shown. The $2\frac{1}{2}$ in. Angle Girder bolted to the cross member should, however, be fixed at the same height as the runner, and positioned centrally over the shaft rod. Before tightening up the couplings connecting these you will need one Meccano Part No. 28, $1\frac{1}{2}$ in. diameter Contrate Wheel and four $\frac{1}{2}$ in. Pinions, Part No. 26. The Contrate Wheel and three of the Pinions must be moved along the various shafts until they are in positions indicated in photo C. The shaft from the Contrate Wheel to the outside of the traverser baseboard is supported by a Meccano Construction illustrated in photo G. This is built from a $1\frac{1}{2}$ in. Corner Bracket, Meccano Part No. 113, bolted to the side of the runner and with a $1\frac{1}{2}$ in. Angle Girder bolted on top so that it projects $\frac{1}{2}$ in. below the Corner Bracket. Two Axle Rods, one $5\frac{1}{2}$ in. and one 5 in. are joined by a coupling as you can see in photo C to turn the shaft from the



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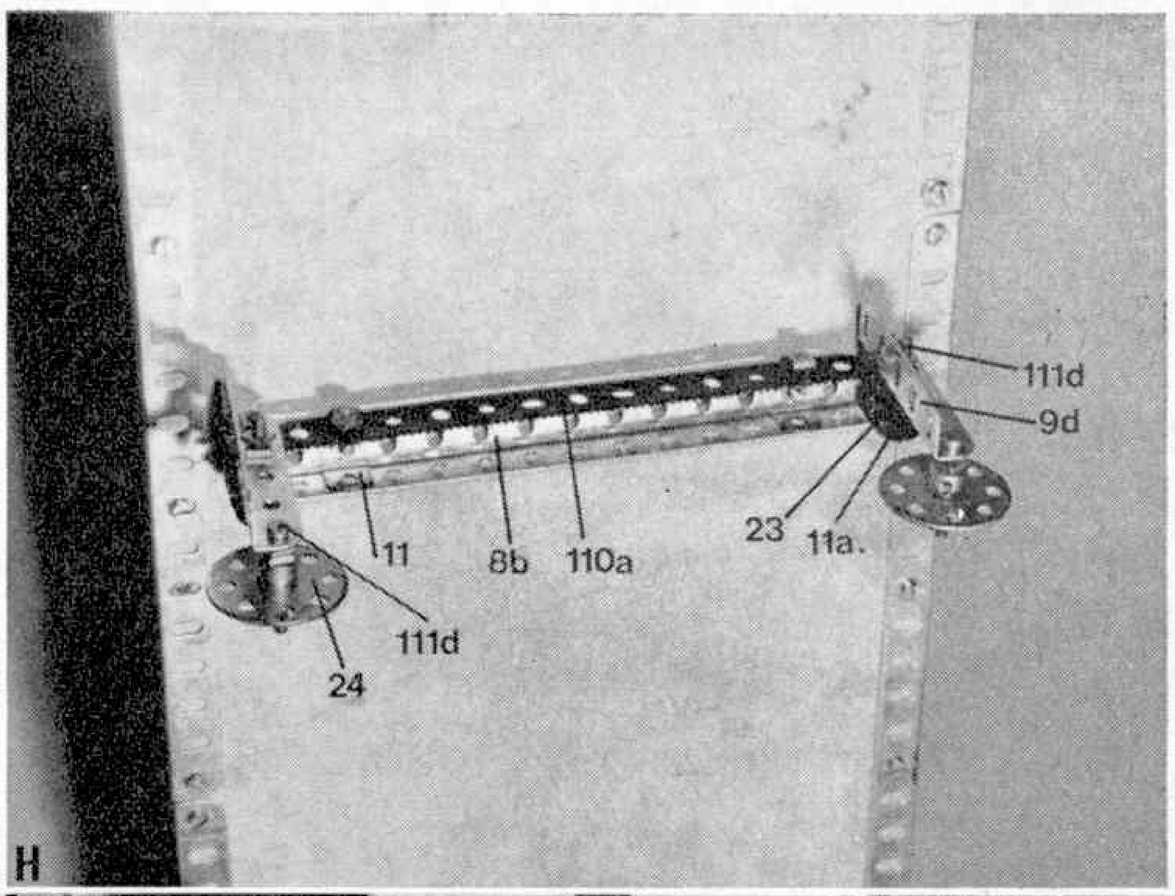

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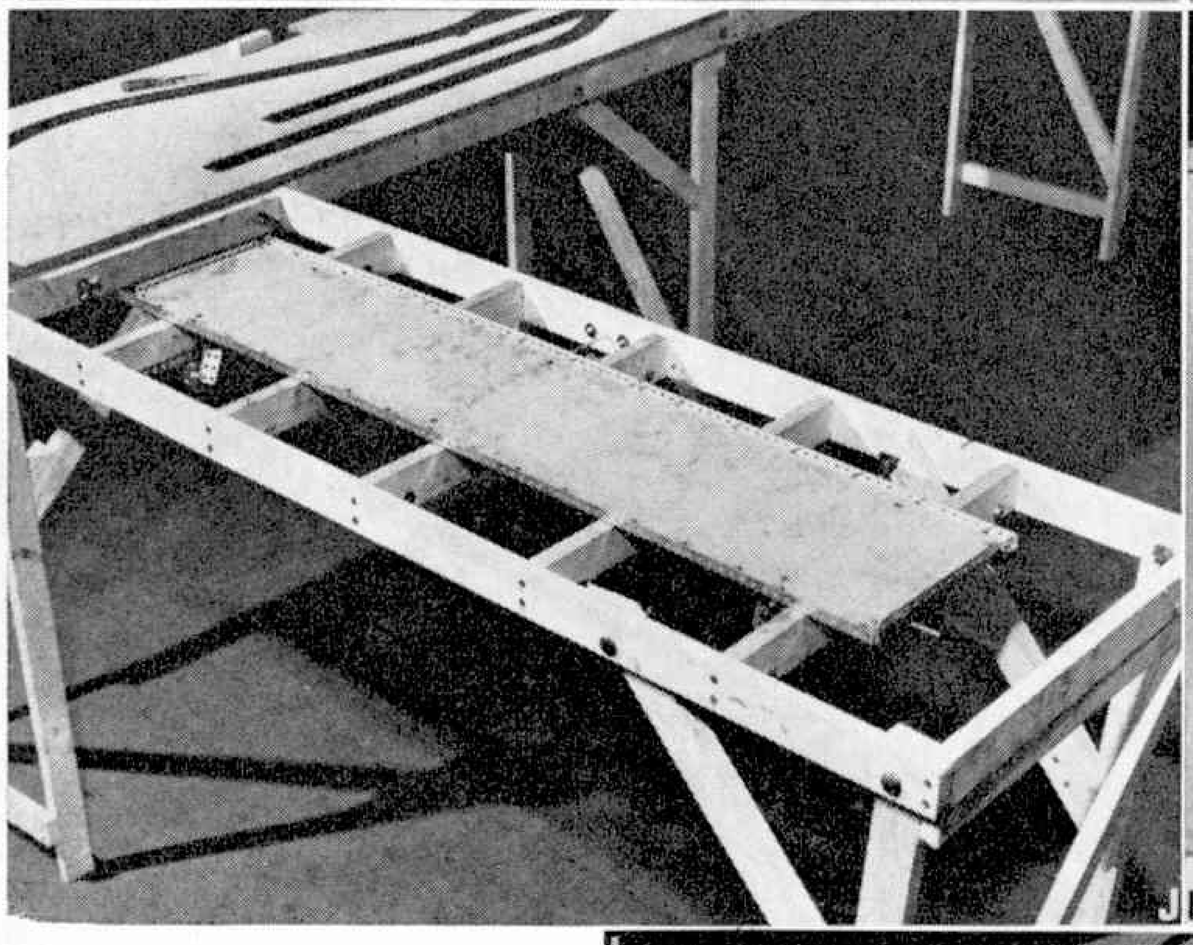

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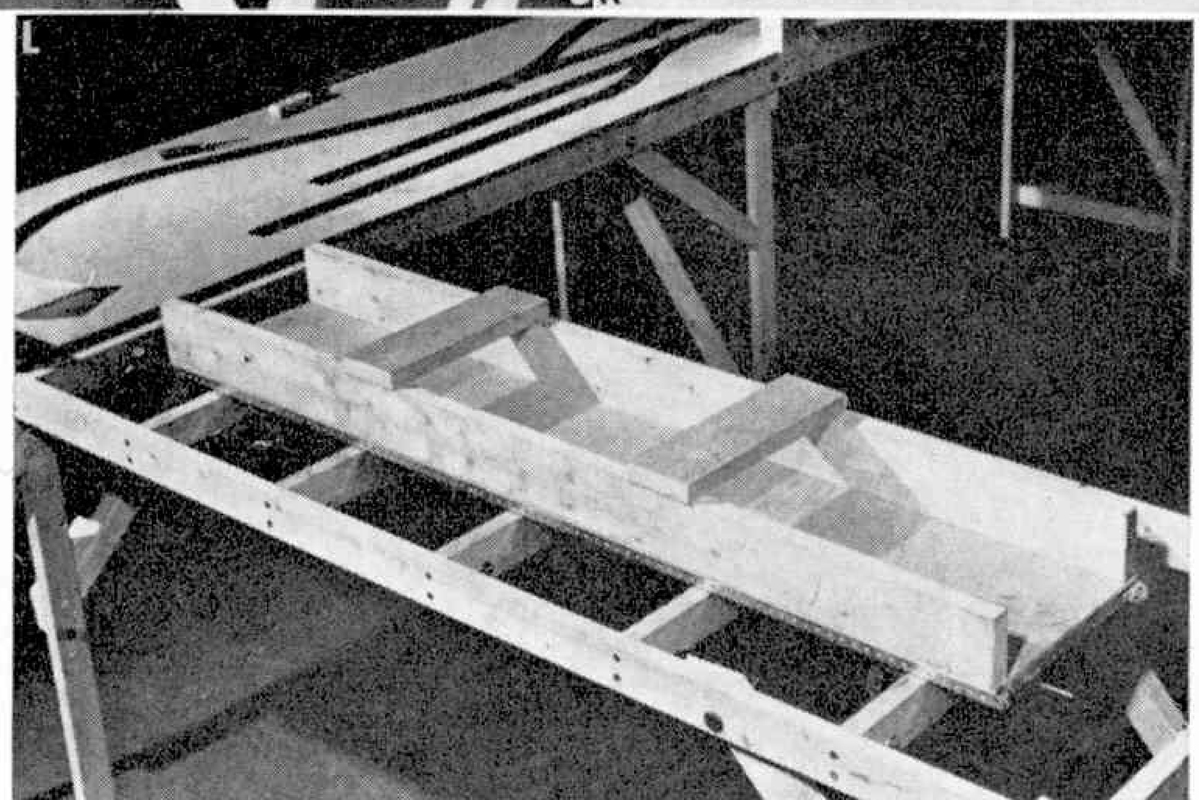


L

traverser handle. The additional 1½ in. Corner Bracket at the other side of this coupling is bolted to the Angle Girders holding the Bushed Wheels situated on the underside of the traverser base. On the other side of the 2½ in. Strip is a Collar tightened to prevent any movement of the two rods. The handle on the outside of the baseboard is simply a Bush Wheel, Meccano Part No. 24, with a threaded pin 1⅛ in. long bolted on.

Now that all the bits and pieces of the Meccano mechanism have been added, the various gears and couplings can be tightened up and work started on the construction of the traverser base. This is cut from $\frac{3}{16}$ in. ply, 3 ft. 6 in. long and 9 in. wide. The two pieces are cut to these dimensions, one of which is for the transverser base, to be dealt with shortly. From the end of the other piece, mark across 4½ in., 19½ in. and 37¾ in. These are the positions of the runner assemblies and wheels (shown in photo H) which will coincide with the runners fitted to the traverser baseboard. Before these are assembled and fixed on, however, obtain two Meccano Parts Nos. 7 and 7a, and drill along the two edges of the plywood approximately every six holes. This can be varied to avoid coinciding with the cross-members of the baseboard and also for the joints between the two Angle Girders. Use one No. 7 and 7a to each side, and bolt on with the heads of the screws beneath the board. The face of the Angle Girders with the elongated holes should make contact with the surface of the plywood and their purpose is to strengthen the traverser base and also to remove any twist or warp that might distort it. A further two Girders are added to the ends of the base as you can see in photo J. The runner assemblies can now be built up from the parts shown in photo H and screwed, once two holes have been drilled along the centre lines, to the underside of the traverser base.

The Corner Bracket mentioned previously is bolted to the appropriate Angle Girder on one of these runner assemblies which, incidentally, you will not be able to tighten up until each of the Bush Wheels is in position under the runner girders. Although it is not absolutely clear from photo H, a ½ in. Pulley, Meccano Part No. 23, is contained between each of the two 2½ in. Angle Girders and ½ in. by 1 in. Angle Brackets on the runner assembly. These run along the top edge of the runner Angle Girder on the traverser baseboard and are held in position by nuts on the 1⅛ in. long bolt which you can see locknutted in the photo.

The final step in the construction of the traverser is the tray which you will see illustrated in photos K and L and which is built from the 3 ft. 6 in. by 9 in. piece of ply mentioned above. One inch panel pins are used to fix the two side members of the tray, which are 3 ft. 6 in. long by 4 in. high to the base, and two additional pieces can be nailed on top to act as handles. The size of these is not important and you can, if you wish, also nail or screw to these door handles.

Finally, the baseboard surface of Sundeala or insulation board can be cut out and pinned on to the two station baseboards. Two additional pieces should also be used at either end of the traverser section.

NEW LOOK CATALOGUE FROM ROVEX

NOW available from any dealer, the latest Tri-ang Hornby catalogue—the thirteenth edition—costs 1s. 6d. and includes no less than 32 pages, six pages more than in the last catalogue. It shows the changes that will occur to the Tri-ang Hornby range in 1967, and has an attractive cover depicting a locomotive depot scene—a reproduction of a painting. Of the new items planned to appear, the most outstanding feature is undoubtedly the new locomotive which should appear early this year.

A model of the L.S.W.R. Drummond M7 0-4-4T class of locomotives originally introduced in 1897, this is quite unique in several respects. It is, first of all, the only locomotive in any model railway system to be built to this wheel arrangement and it has, in addition, two features quite new to both Tri-ang Hornby and commercially produced model railway locomotives generally. First of these is a smoke box door that opens to reveal intricate tube and boiler detail and secondly can be seen in the cab (when the locomotive is running) a realistically glowing firebox. There is also sufficient space in the cab for a driver and fireman to be stood. Both are quite outstanding developments and make this new locomotive something of a pathfinder. Painted in B.R. livery with the number 30027 on the cabside, the engine is No. R.754 in the catalogue and will cost about 50s. It should be available very shortly from all Tri-ang Hornby stockists.

The fourth and fifth pages of the new catalogue explain special Tri-ang Hornby features such as, for example, 'Magnadhesion', which is a system of giving locomotives more pulling power and better performance up hills by the inclusion of strong magnets built into the locomotive chassis to make the steel rimmed driving wheels grip the steel rails of Super 4 Track. This gives greater adhesion without increasing weight and thereby minimises damage if the locomotive is dropped. Another special feature of Tri-ang Hornby is 'Synchrosmoke', which gives locomotives a synchronised smoke effect by having a piston connected to the driving wheels so that smoke is ejected in realistic puffs from the engine chimney.

In the range of diesel locomotives, illustrated on pages 6 and 7, Tri-ang Hornby is very well represented with models of the English Electric Type 3 Co-Co (R.751), Brush Type 2 AIA-AIA (R.357), and the new Hymek B-B diesel hydraulic locomotive (R.758). There are also, of course, three shunting locomotives and the Blue Pullman.

In the range of steam locomotives, which now numbers 13 with the new 0-4-4T, there is the recently introduced 'Hall' Class locomotive, 'Albert Hall', No. R.759 and the 4-6-0 Class B12 locomotive No. R.150S. Altogether there are 22 locomotives to choose from, including the two you can find illustrated on pages 10 and 11 of the catalogue. On these pages are shown the components of the catenary system which was also used in the series of five impressive photographs taken on a Tri-ang Hornby layout. The two pantograph locomotives on these pages are the B.R. Bo-Bo, Class E.3001, and the EM2 Co-Co locomotive No. 27000 'Electra'.

On pages 12 to 15 are shown the seven Tri-ang Hornby train sets—four goods and three passengers—all of which were illustrated in the 1966 catalogue. The types and components of the sets have not changed and the range remains as before.

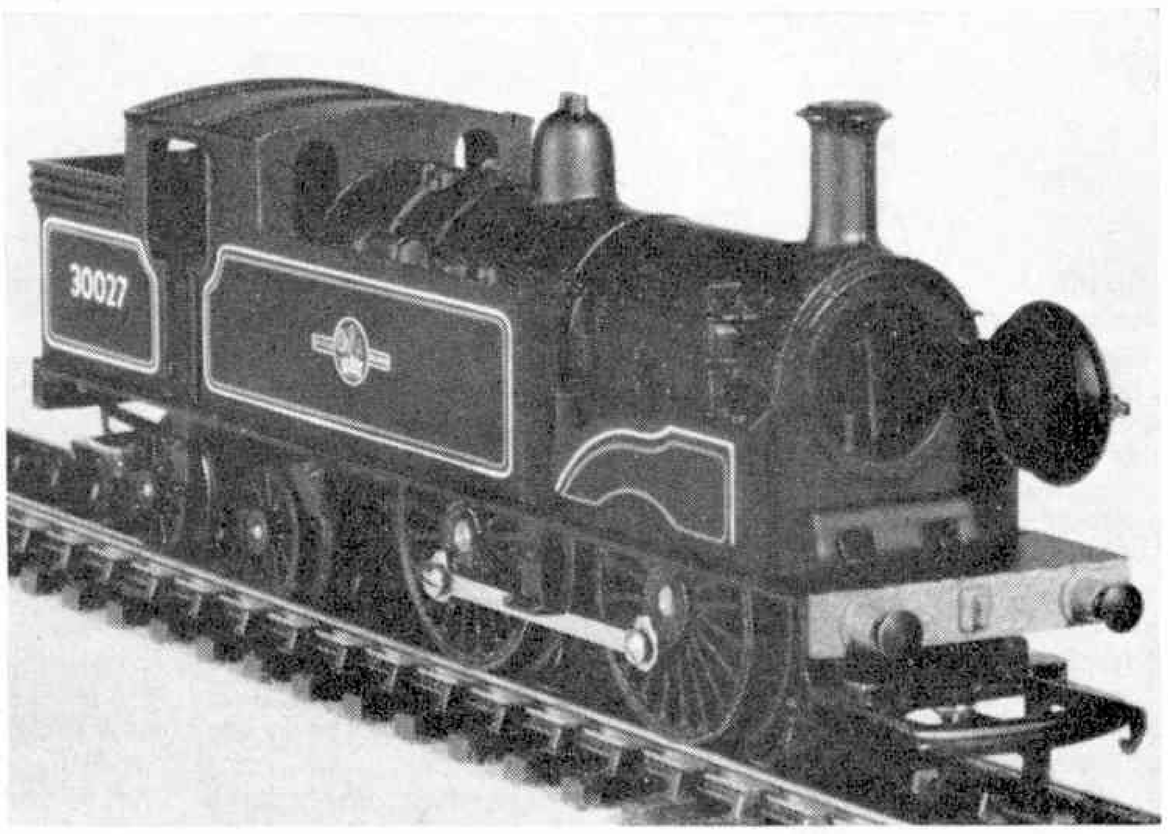
In the field of goods rolling stock on pages 16 and 17, the most interesting new feature is the Liner train No. R.633, which includes three special containers, each with opening doors at one end and painted in a distinctive red and white livery. These are mounted on a bogie wagon and bear the numbers 05871, 05872 and 05873. The other two additions are a new Brake Van of the L.M.R. type with a veranda at both ends and a Bogie Bolster wagon with three Minix Ford Vans in red, white and blue.

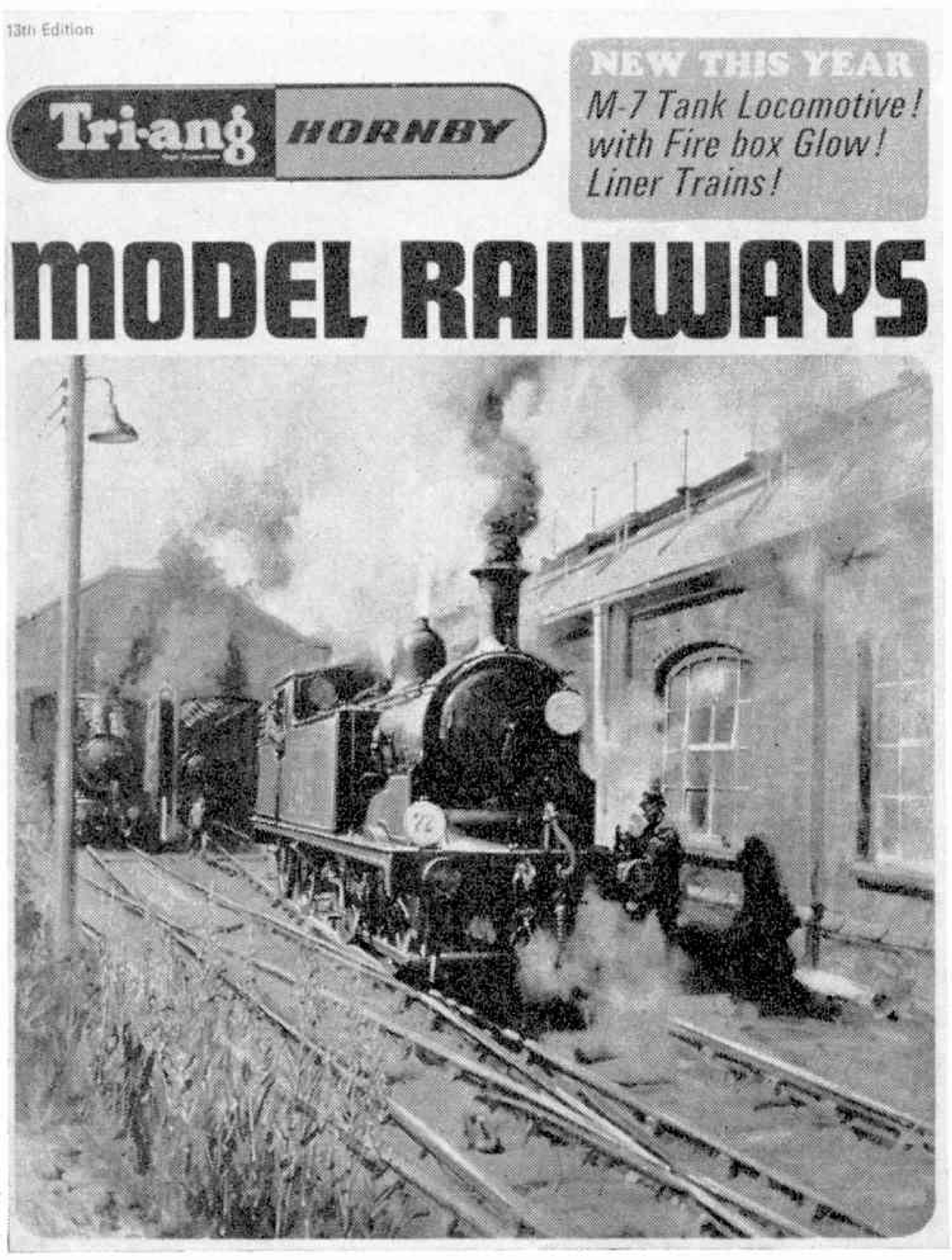
Passenger rolling stock on pages 18 and 19 now include a buffet car in the new blue and white livery and also a converter horsebox wagon No. R.578 which has a Tri-ang coupling at one end and a Hornby Dublo at the other, to allow passenger trains of mixed stocks to be used together.

The 'Battle Space' series has been further added to and although not new in the catalogue one of the more unusual items is the Battle Space Turbo Car No. R.752, which has a variable speed propeller at the rear. This car is fun to operate, requiring not a little skill.

New items in 'Battle Space' include a 'Q' car (R.571) in which are used two red-eye rocket launchers. The wagon is operated by a trackside trigger which causes the roof and sides to fall away and the rocket launchers to swing through to 90° and elevate into the firing position. There is also a Command Car (R.725) and a Sniper Car (R.639) in which is hidden a sniper who springs up to fire. For trackside effect, Tri-ang Hornby have a multiple ground-to-air missile site (R.671) with a radar controlled red-eye rocket unit and a twin ground-to-air missile site (R.670) in camouflage fortified position, once again. Three other new vehicles in the range are the tank recovery wagon with a rail mounted heavy duty crane and 'Honest John' pad and rocket. To complete the range of 'Battle Space' vehicles is finally a Prisoner of War Car.

In the remaining six pages of the catalogue are shown and listed the Tri-ang Super 4 track components, station accessories and buildings, bridges, tunnels and finally the dual road/rail equipment.





Continued from Page 17

adhesive. This window fills the whole area between the rear roof supports, its size best being ascertained by holding and marking the acetate in position on the model. Note, however, that the window is curved slightly and, because of this, the lower edge of the acetate should also have a slight curve so that it will keep its shape.

When everything is dry, the whole model can be reassembled, but remember to replace the bonnet before fixing the baseplate in position. Actually, the base may turn out to be a bit of a problem and, if you can, I advise you to screw it in place using self-tapping screws. I did this, first drilling small holes in what remained of the rivets with a 0.081 in. diameter drill. The self-tapping screws were as supplied by Nettlefold & Moser Ltd., Dunnings Bridge Road, Bootle 10, Lancs. Finally, the model needs only to be repainted and you will then have a pretty good example of a Fiat 2300 saloon!

At the turn of a wheel with Ken Wootton

The TOOTSIETOY Line

FURTHER to my article in 'Model Roads & Racing' for November 1964, which dealt with the range (as I then knew it) of Tootsietoys made by the Dowst manufacturing company of Chicago, U.S.A., I've since acquired a few more models by that firm (though not nearly enough for my liking) plus the following information, for new readers etc.: There *was* a Tootsie Chrysler Airflow Sedan, I've just managed to secure one, it's smaller than the Dinky model, less than half as big in fact, with really fine casting details. This is now very difficult to find, but not as difficult as the La Salle saloon and coupe. These, to the same scale as the Grahams below, are real beauties and scarcer than hens' teeth—anyone got a couple to spare?

These were produced around 1934 (Dowst started producing Tootsietoys in the early twenties) —with a range of 3 in. cars with 'named' radiators like Chevrolet, Buick, Cadillac, etc., and with interchangeable rear bodies. In 1935—Ford Sedans and Coupes, Mack Trucks, Graham Paige cars, tanks, armoured cars, aeroplanes, dolls' furniture, trains, tractors, toy guns, in fact literally hundreds of models of all types—a vast range, far bigger than Meccano's Dinky Toys and probably most of us will never know the *full* range, for few catalogues were produced. Tootsietoys are still produced today, but they lack the high standard of finish of the models produced in the '30s which were very much ahead of their time. Nowadays, they are just toys and few collectors keep them.

Now to the models. The first photograph shows, from left to right, a Mack Truck with anti-aircraft gun attachment. This model is in its original state, i.e. colours and wheel/tyres. It's a one-piece chassis-cab-bonnet casting which is painted buff for the truck and a black base for the gun, which is a separate casting in two parts —gun stand and barrel. The second model is the Mack model, but with a different rear attachment —that of a searchlight which rotates and can be elevated in much the same way as the gun in model No. 1. The searchlight face is of polished tin and the whole truck has been repainted crimson by someone, over its original orange. I must state here emphatically that ***any*** old model —if the paint condition is reasonable—is far more valuable, left in its original state, with perhaps just a thin coat of varnish to restore it to its early splendour.

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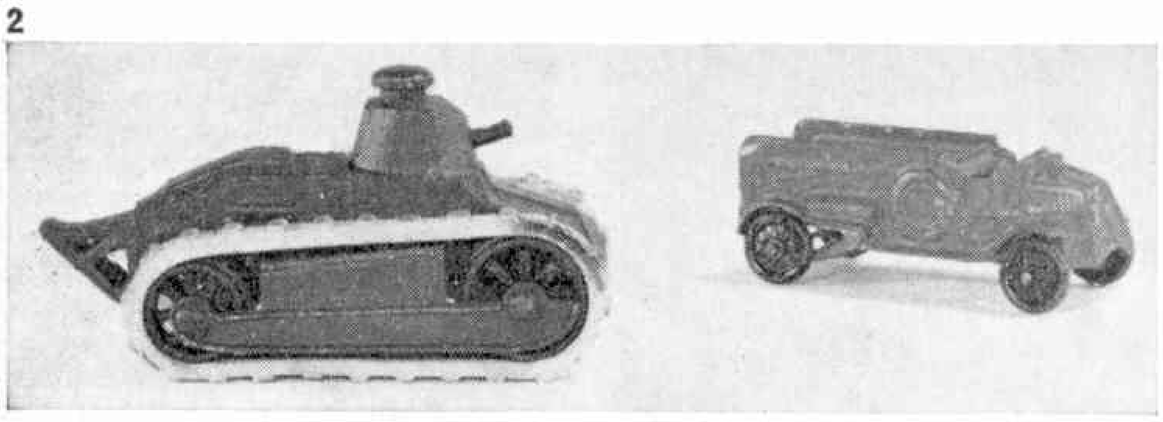

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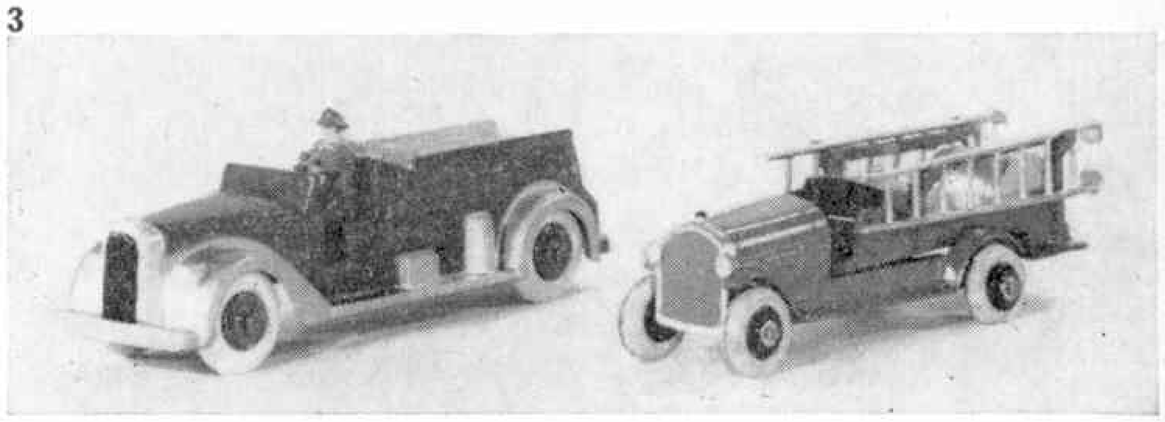

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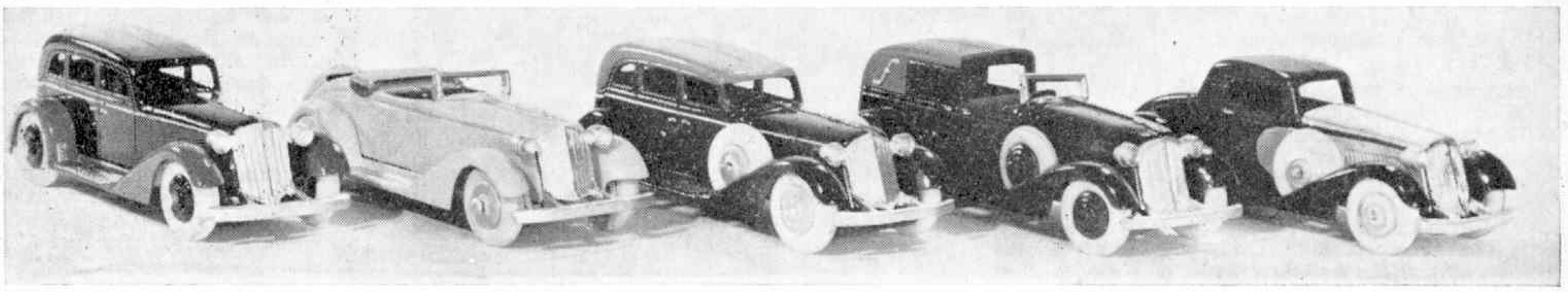


The third model, again a Mack, but a farm wagon in buff and orange original paint. The fourth Mack is a U.S. Air Mail delivery truck. This, once more, is original and yet again, orange for the cab and chassis unit and buff for the cage-box attachment at the rear which housed the American mail. It's very nicely cast with the 'wire-cage' holes drilled out and the words 'U.S. Mail—Airmail Service' and the American eagle embossed on each side. The cab and bonnet (or should I say hood?) on all these Macks, sport *raised* detail—not recessed as in the later issues—and a big 'M' for Mack on the front. Beneath the rear chassis is stamped Tootsietoy.

Now I don't know whether the model No. 1 with gun was issued *before* or *after* the three others, but I *do* know it's a different casting. It differs in that the radiator is more square when viewed from the front, the mudguards are narrower, it lacks door hinges, door handles and a radiator filler cap. Also the word 'Tootsietoy' is stamped inside the roof instead of the chassis. All this leads me to believe that this is the earlier version and that the above refinements were added later. Something else you'll see from the illustration, is that the mail truck has rubber tyres. It appears that these ran side by side with the solid wheel types.

The second picture shows two models, one a nicely detailed Renault F.T. Tank with moving spoked wheels and white rubber tracks which are in amazingly good condition without any trace of stretching or cracking. This has been repainted by someone unknown, in olive drab, the original being a metallic crimson which seemed very popular before the last war with toy manufacturers (anyone remember the matchstick-firing cannon and soldiers, one could buy in the thirties from Woolworths—for twopence I think—and which were in these same metallic colours of red, blue, gold, silver, etc?). The second model represents an early chain driven Mack fire-engine, with open rear end. Raised details include such items as pickaxe, spare wheel, etc., and it's finished in red. Date of this earlier Mack is around 1932.

In the third photo, I show a very early Tootsie fire-engine with slightly out of shape tyres! due to age. The bonnet and mudguards are in 'original' orange—a popular colour, it seems, with Dowst—while the rear bodywork was blue which I had to repaint, picking out the tanks and ladders (which are detachable) in gold. Not counting the wheels, axles, and ladders, this is a two-piece casting with the 'blue part' being caught beneath the dash-board and riveted to the chassis behind the back axle. It's a nice little rarity and worth looking out for to place in one's collection.

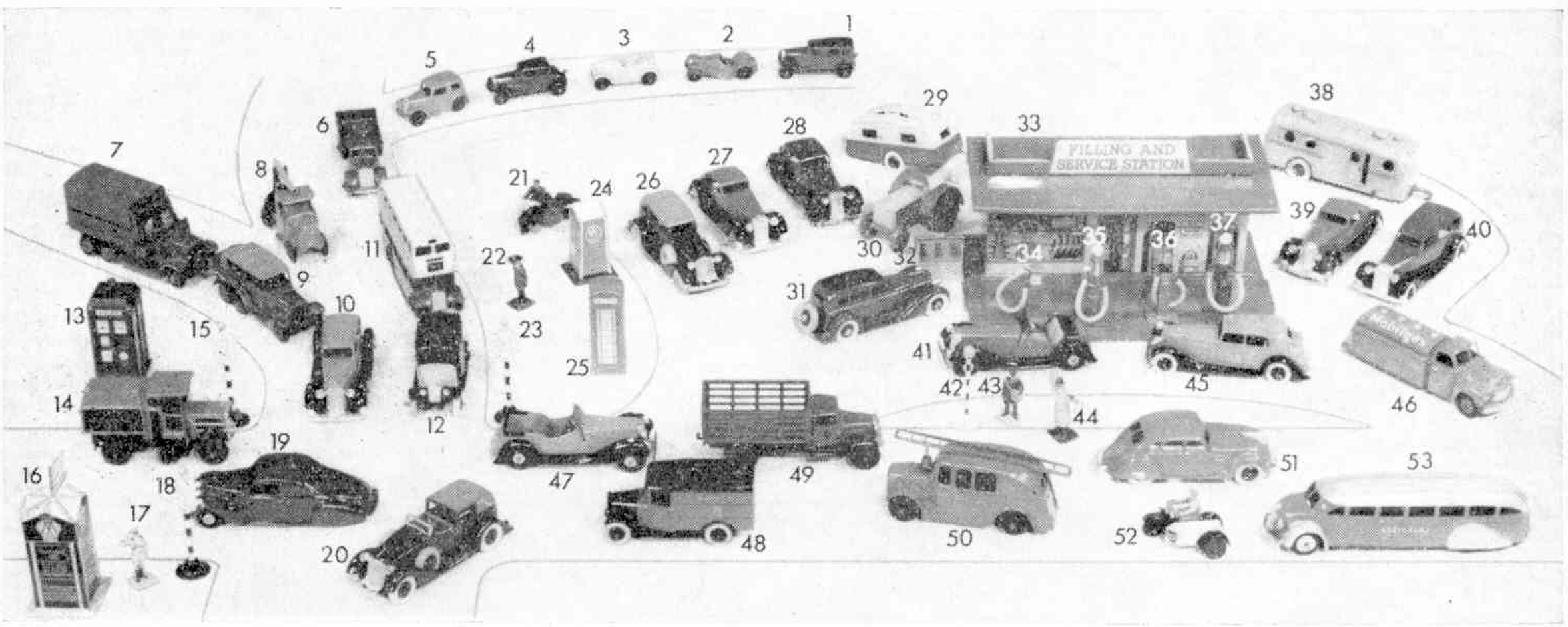
The second model (on the left) is a fire-tender, too, but this time of much later date than the one just described—probably ten years younger. I would say around 1936-7. A one-piece die, with a driver in blue livery who is fixed to his seat by simply pushing him through the hole provided and with a hot iron or similar, splaying out the metal, so that he becomes attached, and a part of the body. The truck needs no description, is in excellent or mint condition and sprayed red and silver. I'm pretty sure you could originally buy the model complete with detachable firemen who probably sat in line at the rear but, of course, they disappeared at an early date in the vehicle's life. It has no base-plate, in common with the rest of the models shown so far, but bears the usual legend 'Tootsietoy'—just forward of the back axle, and beneath the bonnet—'Made in the United States of America'. I have another fire-truck of the same vintage and make, but with a different body, which sports a hose fitment.

Now comes one of the nicest Tootsies, and in the heading photo resplendent in orange and green, stands a late 'thirties Mack truck with gasoline trailer. The tender is moulded in two pieces, having orange cab, black mudguards and base. It's a ten wheeler with double wheels at the back and also on the trailer. The upper part of this trailer—which is attached with clips—is a tin-plate pressing in bright green with transfers in black. The trade name, etc., are stamped beneath both items. This Mack truck also towed dairy wagons, car transporter trailers and a stream of hopper wagons. Photo 4 displays five of the much sought after Graham Paige Blue Streak series of models.

The saloon on the left is included for comparison with the saloon (third from the left) which has a spare wheel placed on the body side instead of the rear as in model one. This model is mint with dark green body and red mudguards, which sounds awful but is really rather smart. The second Graham, a convertible with open dicky seat and rear spare wheel, is a repaint by me in bright yellow and tan upholstery. Model three is mint with body and mudguards in mid brown and the roof beige to suggest a leather roof panel. The fourth model is Tootsies answer to Dinky's Town Sedan and it's a far better model, too! It's their Coupe De Ville and is quite different from the other Grahams in body and chassis mouldings. This is a *four*-piece casting like the convertible, because of the separate dash, steering wheel, windscreen assembly. Once more originally *orange*, I now have it finished in mid/dark blue with matt grey top, grey interior and brown woodwork.

The last Graham Paige here, is coupe which I had to repaint and decided on a green and silver body with black mudguards. I think it's a pip of a model! All these five, unlike the other models just described, had door and bonnet detail *recessed* as in present day models.

These Grahams, as you can see, could be bought in various body styles—saloons, tourers, breakdown trucks, ambulances, delivery vans and, of course, the town sedan. They were, I'm sure, the ultimate from Dowst who didn't make anything as fine before (except the La Salle), in general detail and authenticity, and to my way of thinking, haven't since. Don't write to ask me why such an abundance of Grahams (generally a little known name in automotive history) were produced leaving the better known Cadillacs, Packards, etc., neglected. There may have been some tie-up between Dowst and the Graham car company or any number of reasons. I just don't know, though I *do* know that these attractive miniature cars are much loved by the collectors lucky enough to have them and much sought after by those who don't!—*More Tootsietoys next month.*



This picture is a repeat from the M.M. for December—the time I popped back to 1939—plus numbers and a list below showing the makes of cars and numbers etc. Many thanks for *all* the letters. Didn't think I'd get so many. A terrific response! The winner is Keith Strong of 23, Okehurst Road, Eastbourne, Sussex, who managed to name all the models plus catalogue numbers. He made only *one* mistake in calling one of the Tootsietoy cars a Auburn when in fact it was another Graham Paige. He also guessed my 'deliberate mistake' correctly when he said 'The Studebaker Tanker 30P could *not* be bought in 1939'. This is quite correct. Many thanks Keith, a good effort on your part and I'll be forwarding you, your choice of the current Dinky Toy Volkswagen 1600.

Runners-up were Jonathan Gee of York, Bryan Foster of Sweden and Michael Edwards of Stanmore, Middlesex.

Most of you missed out on my 'mistake' with suggestions such as 'only one Belisha Beacon or 'one vehicle or another is on the wrong side of the road etc.

No one else remembered the date—1939—and the date of the Studebaker Tanker—1950!

1 Tootsietoy Buick six; 2 Dinky M.F. No. 35C; 3 Dinky Austin 7 tourer No. 35D; 4 Tootsietoy Buick six coupe; 5 Dinky Austin 7 saloon No. 35A; 6 Dinky Lorry No. 22C; 7 Dinky Army Lorry No. 151B; 8 Tootsietoy Mack-Anti-Aircraft Gun-Truck; 9 Dinky reconnaissance car No. 152B; 10 Dinky Armstrong Siddeley No. 36A; 11 Dinky Double Deck Bus No. 29C; 12 Dinky Taxi No. 36G; 13 Dinky Telephone Police Box No. 42A; 14 Morestone Road Sweeper; 15 Dinky Traffic Light 4 face No. 47A; 16 Dinky A.A. Box No. 44A; 17 Dinky A.A. Guide No. 44D; 18 Dinky Traffic Light 2 face No. 47C; 19 Dinky Lincoln Zephyr No. 39C; 20 Tootsietoy Graham Paige Town Sedan; 21 Dinky R.A.C. Bike No. 43B; 22 Dinky R.A.C. Guide No. 43D; 23 Dinky Traffic Light 3 face No. 47B; 24 Dinky R.A.C. Box No. 43A; 25 Dinky Phone Box No. 12C; 26 Tootsietoy Graham Paige saloon; 27 Dinky Rover No. 36D; 28 Dinky Humber Vogue No. 36C; 29 Dinky Caravan No. 30G; 30 Dinky Tractor No. 22E; 31 Tootsietoy Graham Paige Saloon; 32 Dinky Oil Bin No. 49E; 33 Dinky Filling Station No. 48; 34 Dinky Wayne Pump No. 49B; 35 Dinky Shell Pump No. 49D; 36 Dinky Bowser Pump No. 49A; 37 Dinky Theo Pump No. 49C; 38 Tootsietoy Caravan; 39 Dinky Bentley Coupe No. 36B; 40 Dinky Vauxhall No. 30D; 41 Dinky Salmson 2 seater No. 36E; 42 Dinky Belisha Beacon No. 47D; 43 Dinky Postman No. 12E; 44 Dinky Policeman on Point Duty No. 42C; 45 Dinky Daimler No. 30C; 46 Dinky Petrol Tanker No. 30P; 47 Dinky Salmson 4 seater No. 36F; 48 Dinky G.P.O. Van No. 34B; 49 Dinky Market Gardners Truck No. 25F; 50 Streamlined Fire-engine No. 25H; 51 Dinky Chrysler Airflow No. 30A; 52 Dinky A.A. Bike No. 44B; 53 Tootsietoy 1932 Greyhound coach

Building Dolphin 16-part 3 by Ron Warring

In January we gave you a set of free full size plans to build a scale model of this attractive little cabin cruiser. Last month we dealt at length with the business of finishing and painting your model, and below you can read how to install the motive power.

FITTING the boat with outboard power is dead simple—just mount the outboard on the transom, connect up to a battery lead in the cockpit and you are ready to go! However, there may be a snag, depending on what type of outboard you have decided to use.

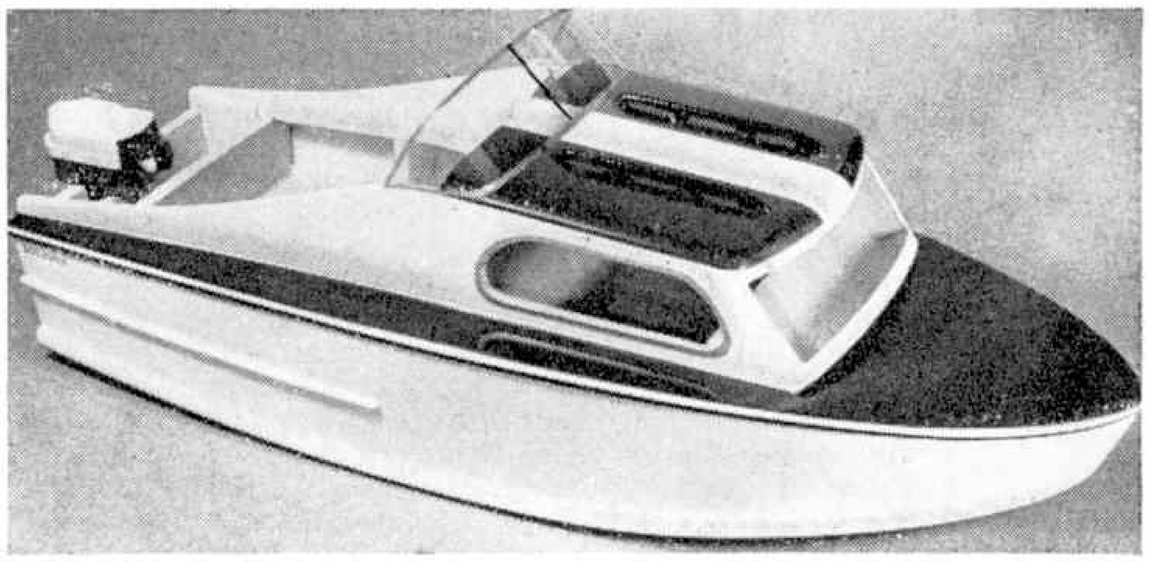
Your model has a truescale transom, which is set at an angle. Many model outboards have a right-angled mount so that if mounted directly on the transom the motor would be tilted backwards. In this case you will have to fit a wedge of balsa or obeche between the outboard mount and the back of the transom so that the engine is mounted in a vertical position.

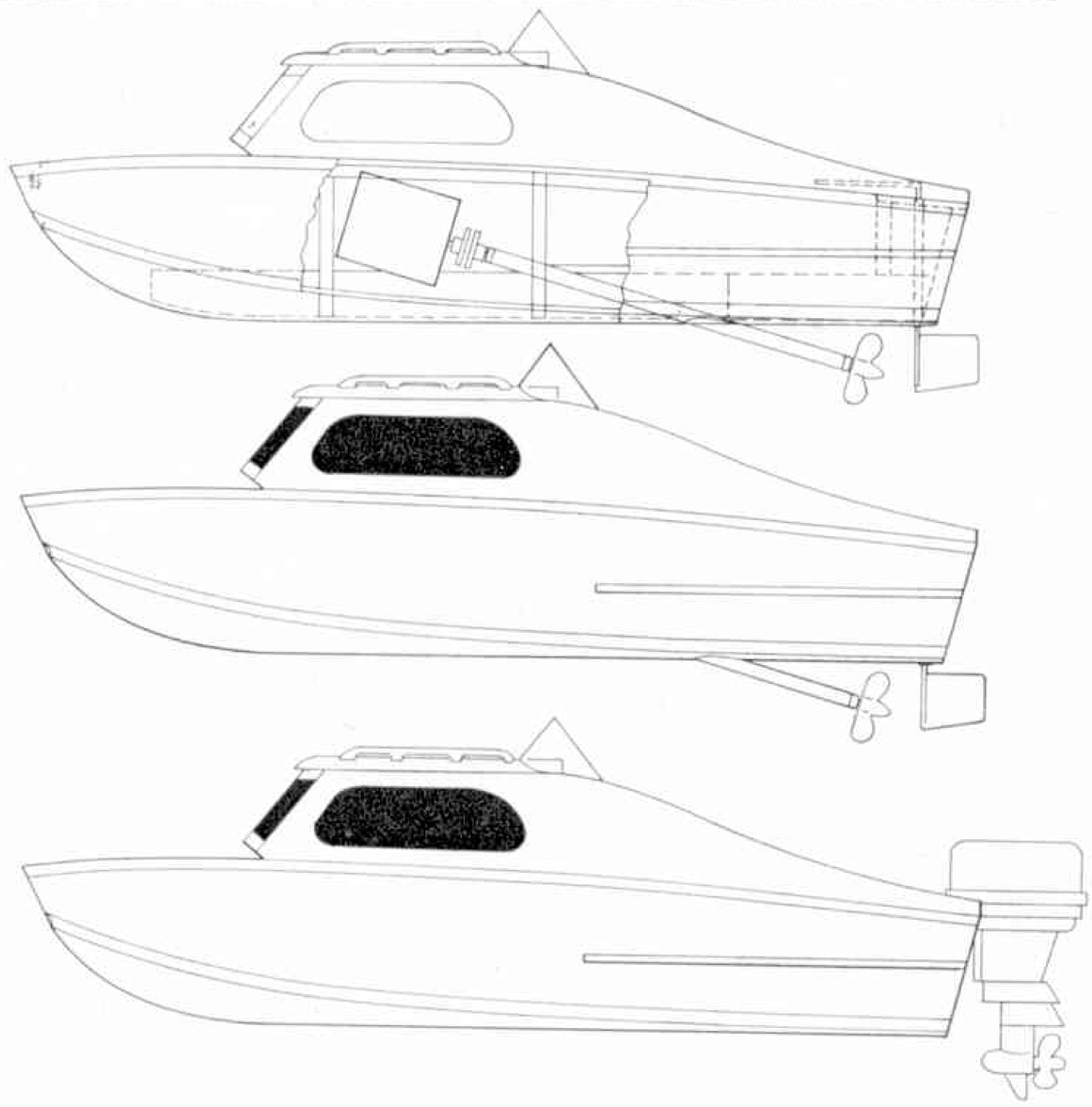
You can use twin as well as single outboards, if you want a more spectacular performance. In this case, you need to widen the cut-out in the top of the transom, as shown in Plan A. The only real difficulty is that you need to double up on the batteries as well as the outboards, using one battery for each motor since the life of a single battery driving two outboards will be very short!

If you are using a fairly large battery (or batteries) you may need to move the battery position forward to get a proper trim. This is particularly the case when the weight of twin outboards has to be carried in the stern. In this case, make the cabin roof detachable and locate one (or both) batteries inside the cabin. The hull has plenty of buoyancy and so can support a lot of extra weight, but make sure that any extra battery weight does not make it float with the stern squatting in the water. The proper trim—the keel line more or less level with the surface of the water—will both look better and give a better performance.

The installation for inboard power is shown in Fig. 15. A 6 in., 6½ in. or 7 in. stern tube is required, fitted through the previously prepared keel (as described in Part I in January M.M.) and any remaining space well plugged with scrap balsa and cement. The motor is mounted inside the cabin, lined up exactly with the stern tube and connected to it with a flexible coupling. The model will take almost any size of motor, from the smallest up, and it is simply a matter of trial and error to find the best way to mount it.

A small motor of 1 in. diameter will rest on the keel and can be supported by, and strapped to, a wedge of balsa cemented to the keel. With a larger motor, alignment can be given by notching the keel, using additional scrap sheet and block balsa to hold the motor in place. With a larger motor still, it may be necessary to cut away a part of bulkhead 2 in order to accommodate it.





Outboard version

Suitable (electric) outboards—

Super Neptun*	32/6
OB-300*	10/6
Johnson (scale)*	34/11
Evinrude (scale)	36/–
Elmic Sprite	29/6

The Elmic 'Thrust Pak' is a complete small electric motor, stern tube and propeller assembly ready to install. Price 26/2.

*Ripmax

Inboard version

Stern tube—6″ for small electric motors.
6¼″ for medium electric motors.
6½″ for large electric motors.
7½″ heavy duty for 0·5-1cc diesels.
Propeller—1″ dia. plastic or metal for small electric motors.
1¼″ dia. for all electric motors.
1¼″ dia. for diesels.
Rudder assembly—Small for small to medium electric motors.
Medium for large electric motors or diesels.
Medium size (balanced) for radio control.

Except for the very smallest motors, where a 1 in. diameter propeller is recommended, a propeller diameter of 1¼ in. should be used. This will give good results over a wide range of motor sizes.

With inboard power a separate rudder assembly is required to provide steering. This can be a standard commercial unit mounted through the keel just in front of the transom. The tiller arm is then bent forward above the deck line with the rack mounted on the front of bulkhead 6. There is nothing tricky about this, and almost any small or medium size rudder assembly will do.

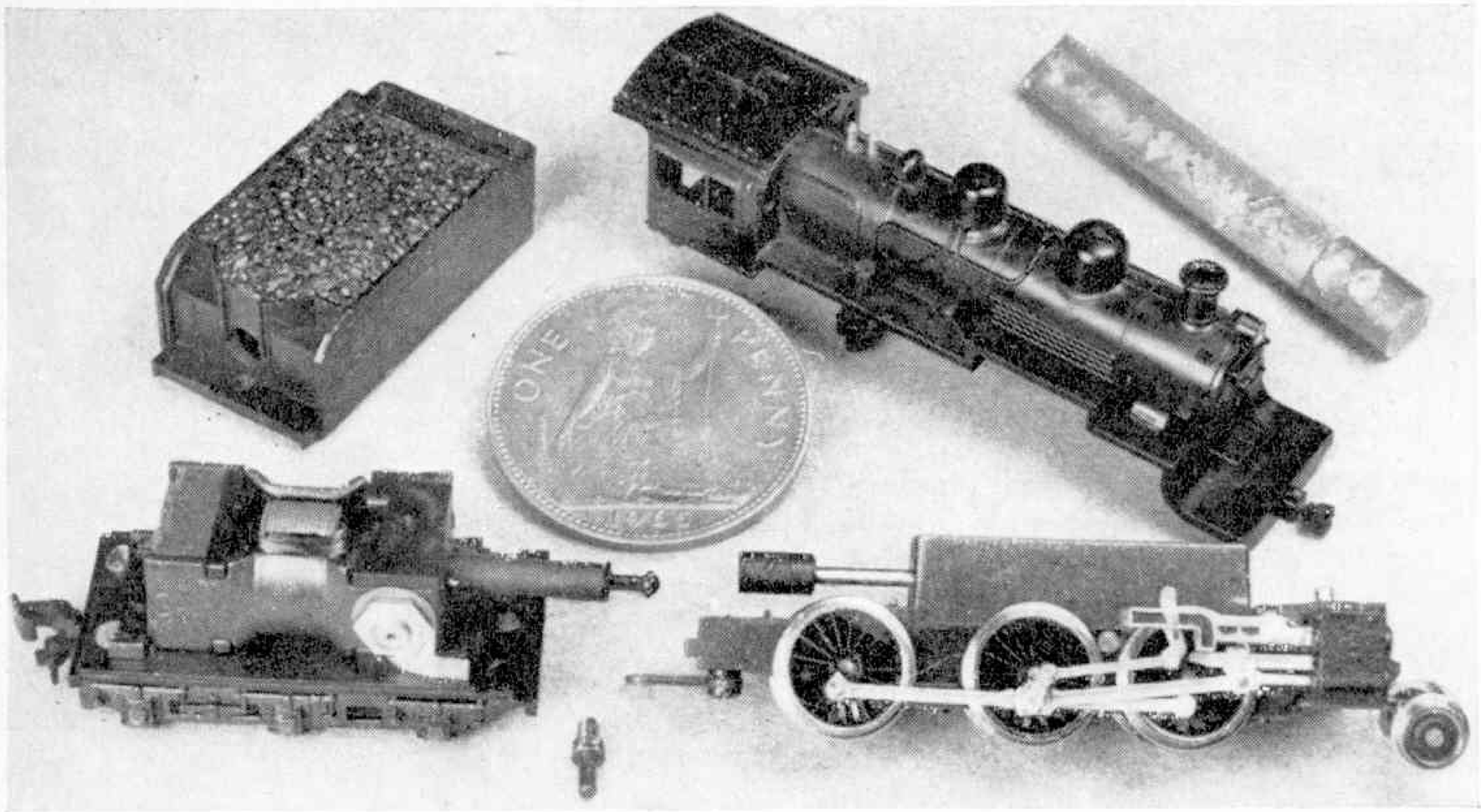
The inboard-powered Dolphin differs in another detail to the outboard version. The transom should not have a cutout and the gap between the two cabin sides from bulkhead 6 to the transom should be planked in with $\frac{3}{32}$ in. sheet. The inboard *or* outboard version has the open 'outboard' type well between the transom and bulkhead 6.

Your Dolphin 16 is of ample size to take radio control, if you wish. In this case we would recommend that you build the *inboard* version when the radio gear and rudder servo should be mounted in the cockpit, covered by a built-up balsa box to protect it from spray. Do not mount a radio control receiver in the cabin near the electric motor, as this will aggravate the possibility of interference from the motor.

There is no reason, if you prefer, why your Dolphin 16 should not be inboard-powered by a diesel instead of an electric motor. There is plenty of room in the cabin for mounting the engine if bulkhead 2 is cut away so that the engine can be mounted well forward. In this case, leave one of the side windows unglazed so that sufficient air can reach the engine.

Diesel powered model outboards just are not made, but there are some glow-engined model outboards obtainable. These are all American and rather difficult to come by in this country and are also expensive. They will, however, give a more sparkling performance than an electric outboard, although they can prove tricky to operate.

HAVE YOU SEEN



FINEST YET!

Thanks to the co-operation of our good friend Shiro Miyawaki, we now have a sample of the latest N gauge product of the Japanese Sekisui company, a C-50 class light 2-6-0 and what a magnificent jewel of a model it is. In outline, it is much closer to British practise than many of the current N gauge steamers from the Continent, and even more important, the wheel standards are considerably finer than any other commercial N gauge.

The 12 volt 3 pole motor is housed in the tender and drives *two* axles via an extremely smooth-running flexible drive and universal coupling. Current is collected through all six tender wheels and conducted via the split axles through the intricately fashioned metal side frames, direct to the motor. No wiring is used and the collection system eliminates all friction-producing wheel collector wipes. Lead weights are carried beneath the tender chassis and behind the motor to ensure good track contact and stability.

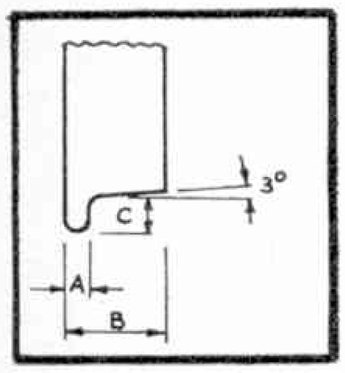
The locomotive body moulding is in matt black styrene and beautifully detailed. The chassis is metal and incorporates a silky smooth worm gearbox transmission to the two front axles. A close-fitting lead weight occupies all the boiler and smokebox not taken up with the gearbox housing.

The driving wheels are fully spoked (not embossed) and all six are flanged, even so, the loco will negotiate the small radius Mini Trix track without trouble although it prefers the larger radius when pulling a load. Wheel tyres and rims are turned nickel silver and the entire valve gear is fully operational!

We reproduce the Sekisui wheel standards from the pages of the 2 M.M. Association Magazine and you will note that the bogie wheels are slightly coarser than the main drivers.

SEKISUI STANDARDS

Scale	. . .	*150:1 (2 mm.)*
Track Gauge	. . .	*9 mm.*
Back to Back	. . .	*·295″*
A.	. . . . .	*·020″*
B. On Loco Drivers	. .	*·072″*
B. On other wheels	. .	*·080″*
C.	. . . . .	*·025″*



Sekisui N gauge products are not yet available in this country and when they do arrive, they will be fairly expensive. The loco described above costs about £3 19s. 0d. in Japan, but it will be £9 0s. 0d. at least by the time import duty, purchase tax and shipping charges are added on. Why, you may ask, do we devote all this space to something most people can't buy? Well, our aim is to show you just what *can* be done commercially in this new gauge, and perhaps to spur on any of our own producers who may be 'thinking N'. The Sekisui standards are a great advance on those adopted by European manufacturers, and are to be commended as entirely practical for the everyday, knock-about user; at the same time they go some way towards meeting the requirements of the rapidly increasing number of true-scale N gauge followers.

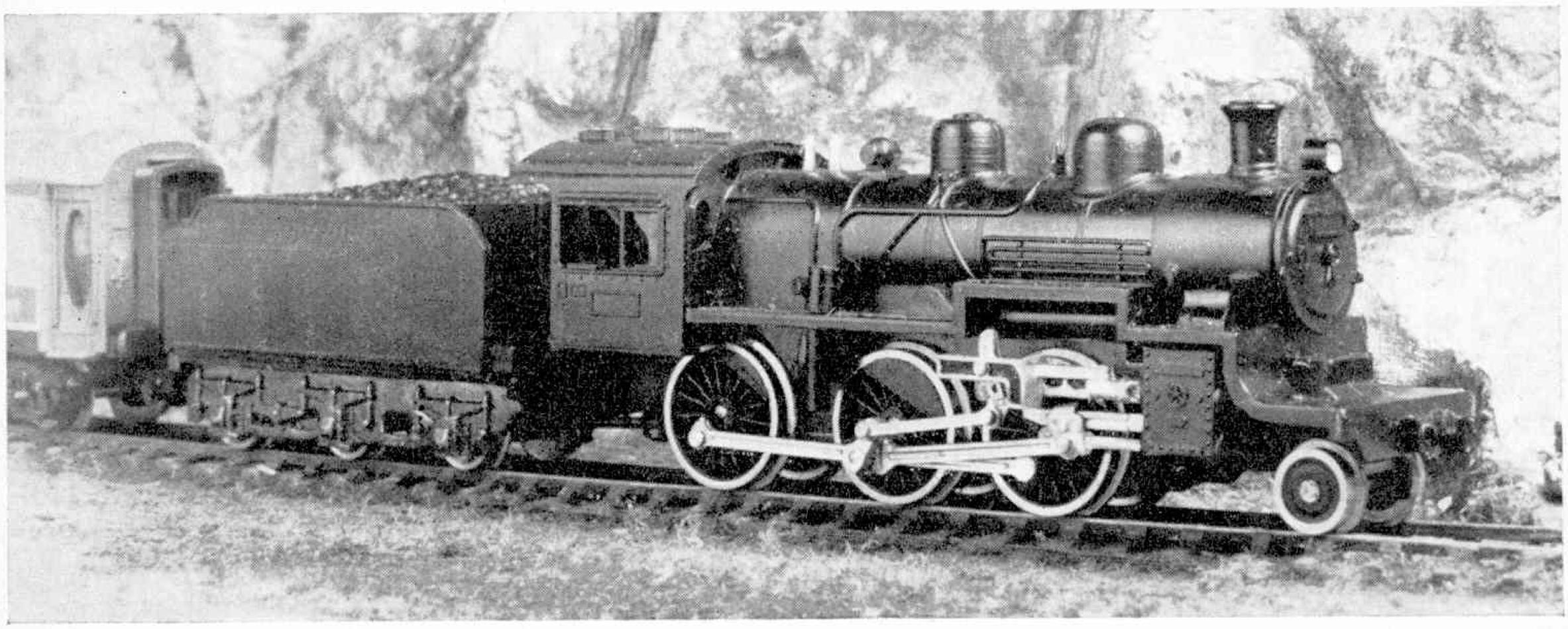
FLEISCHMANN ELECTRIC LOCOMOTIVE (HO SCALE)

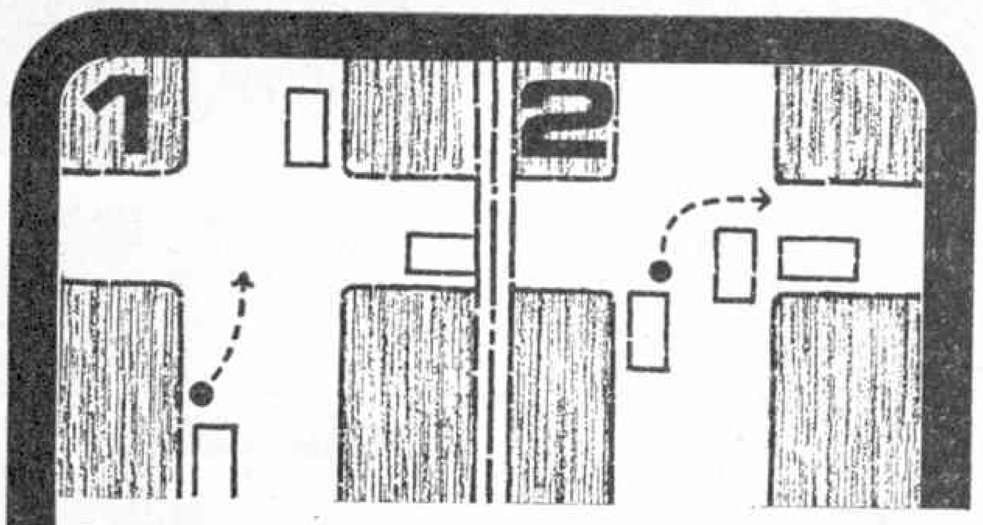
Just recently, four of the world-famous crack express trains of the Deutsche Bundesbahn (German Railways) have been integrated into the Trans Europ Expres scheme. This has meant that a large number of locomotives employed on these trains have been repainted by the D.B. in the attractive T.E.E. livery of red and cream. Fleischmann have obviously been following these events closely, as their handsome D.B. type E 10 BB electric locomotive is now available in the T.E.E. colour scheme.

The body of the model is an extremely robust die-casting, with much of the very fine detail carried on the sides cast integrally. The long row of louvred ventilators and the 'DB' insignia are particularly well done, and the inscription plates, so beloved of German Railway operating staff, carry *legible* details of brakes, weight and leading dimensions. The roof of the locomotive is complete with the usual array of equipment carried by electric locomotives, including busbars, carried clear of the roof by insulators and, needless to say, working pantographs.

Returning to rail-level, the bogie sideframes are the best we have ever seen; even the brake blocks and speedometer drive are there. Traction current is collected either from the pantographs or from the track on the two-rail system, the changeover being effected by an inconspicuous switch on the body side. All four wheels of the motor-bogie are driven via quiet-running nylon spur gears, and the driving wheels are rubber tyred for extra adhesion. The performance of the loco left us speechless. Just a couple of notches of the controller sent it gliding away along the track, with scarcely a sound except the 'click, click' of wheels on track. It hardly seemed to notice pointwork at all! As the locomotive was running on a British make of track, and not the product for which it was designed, its performance was all the more creditable.

This model can't really fail to become a 'hit' with Continental fans, but we predict that a lot of 'British Outline' people will be tempted to buy it for its own sake, as a really superb piece of model railway equipment. The best word to describe it is—Wunderbar! Available from your model shop price £7 7s. 0d. or from King Charles Sports Centre, Railway House, 18 King Charles Street, Leeds, 1.

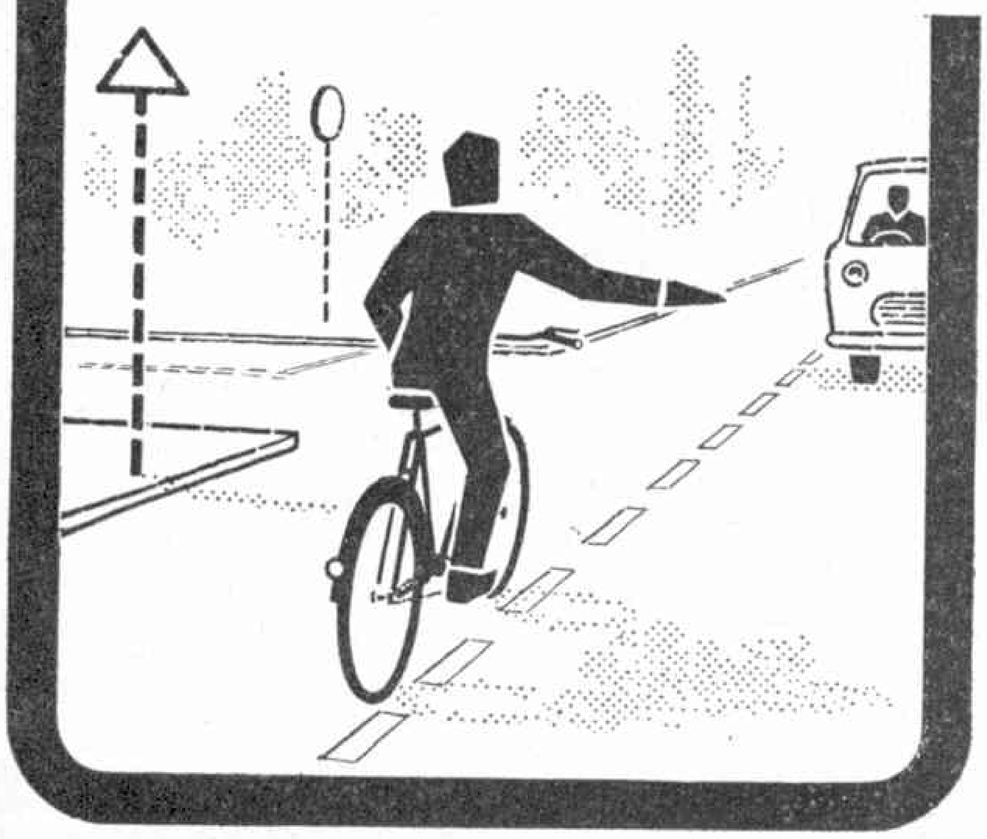




1 If you intend to turn right at a road junction, **prepare in advance!** When you are about 20 yards short of the turn, look behind you. If all is clear, signal your intention, and draw out to take up your position just to the left of the centre line.

2 Do not cut the corner. See that the road is clear to the right and left, wait until oncoming traffic has passed you, then take the corner in a wide arc. Gain the inside lane straight away, so as to let faster vehicles, which may be turning with you, overtake.

HOW GOOD A CYCLIST ARE YOU?

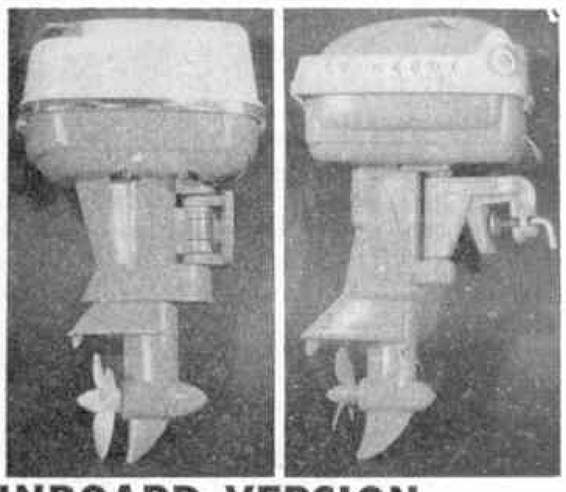


PUBLISHED IN THE INTERESTS OF SAFE CYCLING BY THE MAKERS OF THE WORLD'S SAFEST TYRES

DUNLOP

MOTORS and FITTINGS for your DOLPHIN 16

see page 32



JOHNSON (left) . . . 34/11

A real SCALE MODEL outboard, powerful and dependable with 4½ volt electric motor. Motor is 4½" high and develops a full 2½ ounces thrust.

EVINRUDE (right) . . 36/-

Another SCALE OUTBOARD with the same powerful motor developing 2½ ounces thrust. Clamp-on mount.

SUPER NEPTUN . . . 32/6

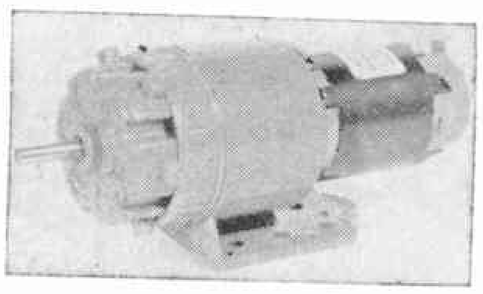
This superb outboard is 5½" high, has 240 degree pivot steering and fitted on-off-reverse switch.

NEW OB-300 . . . 10/6

This inexpensive model is 3½" high with clip-on transom mount. At the price you can afford twins!

INBOARD VERSION . . .

RICHARD I-49/6 or **RICHARD II-57/6** With 6-speed gearbox. Specially recommended for the Dolpin 16!
ORBIT 505-10/11 or **ORBIT 605-39/6**
MILLIPERM-21/- or **MONOPERM SUPER-32/6**
NAUTOCRAFT (for top performance)**-72/6**
* 'RMA' No. 3 PROP ASSEMBLY-**6/3**
* 'RMA' LT'WGHT RUDDER ASSY-**2/9**
with any of above



PLUS THESE DECK FITTINGS

True scale fittings by "Ripmax" which add that extra touch of realism to any boat model

4 FAIRLEADS (P13*) 3 CLEATS (P62*) 4 BALL CLEATS (P61*) 1 ANCHOR (P7 or P9) 1 KLAXON (P43*) 1 LARGE JACK-STAFF (P76) 1 WHEEL (P67) FENDERS, 2 LIFEBOUYS (P2)
* or chrome plated versions

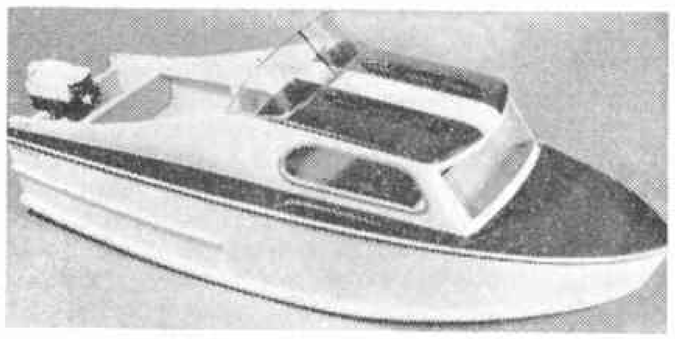
IF IT'S RipMax IT'S GOOD!

Wise modellers always buy RIPMAX PRODUCTS . . . every single item guaranteed to give 100% satisfaction & REAL VALUE FOR MONEY!

AT YOUR MODEL SHOP!

Solarbo BALSA

MAKES MODEL BUILDING EASY!

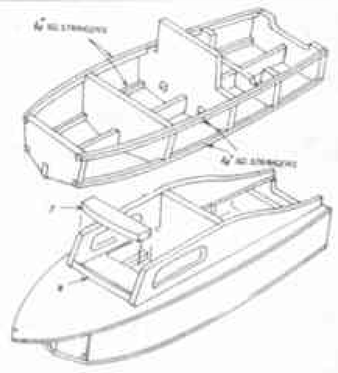


DOLPHIN 16 . . .

This *Meccano Mag.* design makes one of the best boat models ever produced. Lot's of modellers are building two, or even three 'Dolphins' to race against each other and compare the performance of inboard and outboard versions by actual trials. From the Shopping List above you can see that this will still cost less than a single 'kit' boat! That's an added attraction with Balsa models. Besides being easy to construct—and the high strength/weight balsa ensures top performance—Balsa is the least expensive of 'quality' modelling materials. And you can buy it at all model shops.

SHOPPING LIST

SHEET BALSA
2 off 36" × 3" × ¼"
5 off 36" × 3" × 3/32"
STRIP BALSA
2 off 36" × ¼" sq.
2 off 36" × 3/16" sq.
1 off 36" × ⅛" sq.
BLOCK BALSA
6" × 2½" sq.



Remember, Solarbo Balsa is specially selected and graded for modelling use, It costs no more. but definitely is the best Balsa you can buy. Solarbo Balsa always makes better models!

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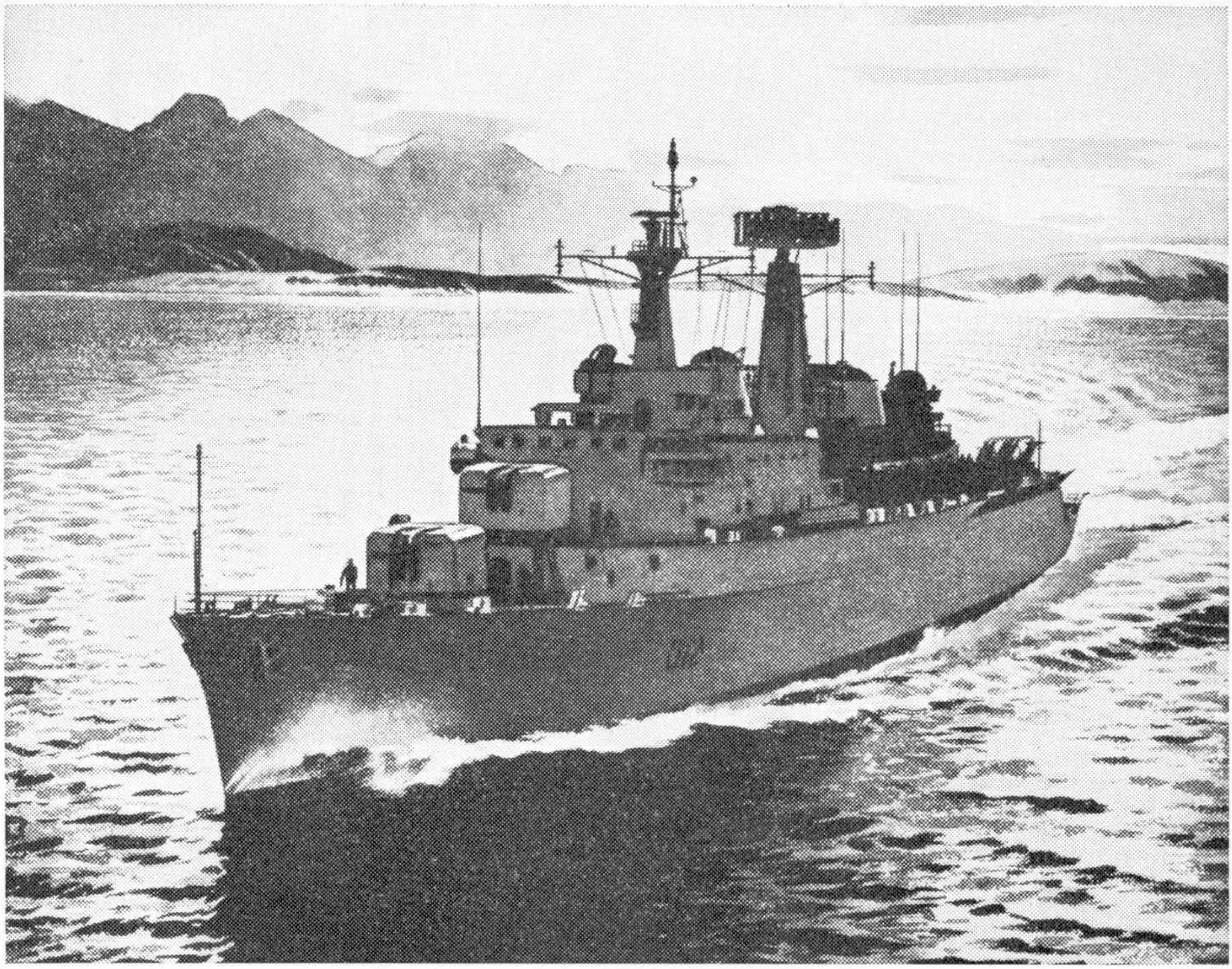

As this Royal Navy destroyer slips away at dawn

Action and adventure lie ahead

Read about life on board – and the great career you'll have.

Where's she going? Sorry, that's secret. Perhaps to the Far East, the Mediterranean or the South Atlantic. But one thing is certain. The men on board are in for an adventurous time.

At sea anything can happen.

Ships may signal for help. Hostile coastlines have to be patrolled. Smugglers intercepted. Battle exercises carried out.

What's she like? She's a guided missile destroyer. She can explode aircraft out of the sky. Seek out and destroy submarines. Search the seas with her helicopter.

She has 60,000 shaft horsepower to send her surging through the waves. Complex electronic radar and automation equipment. Computers. Stabilisers. An automatic pilot.

There are spacious mess decks with bunks and television. Even a TV studio that can send its own programme round the ship!

What about your future in the Royal Navy? It's a great time to join – with new ships and new weapons on the way.

You'll be taught a good trade. Encouraged to continue your education. You'll earn good pay that's now better than ever. No civilian job can offer you more opportunity for steady promotion: today, one officer in three begins his career as a rating. And your training will equip you for a good job in later life.

You'll also live a varied, active life at sea and ashore; at home and overseas. And you'll enjoy world travel, sport in plenty, fine company and an average of 6 weeks' paid holiday a year.

Post the coupon for full details today.

You can join at 15.

Royal Navy

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Please send me, entirely without obligation, the free, new 52-page booklet 'The Royal Navy as a Career.'

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ADDRESS_____

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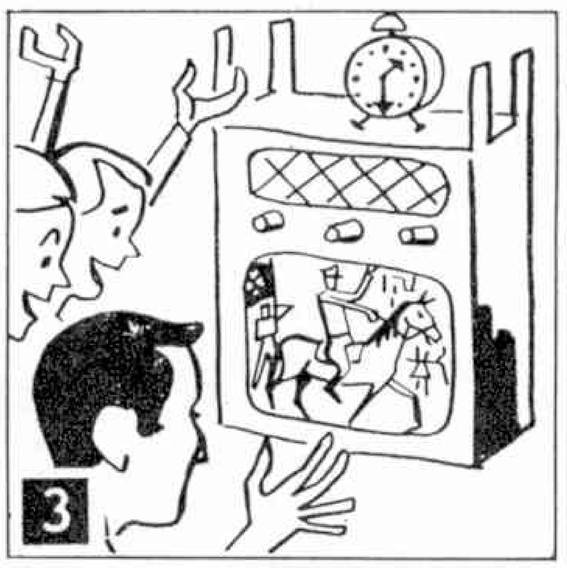
_____ Date of birth_____

FUN & GAMES

Picture Parade?

When your TV goes blank at a crucial moment—say, when you're all set to watch a football match—are you a fix-it-yourselfer? That is to say, are you one of those persons able to replace a tube, solder a wire, etc., to get the old set to work? Such a person is pictured at right. Pictures below are some of his trials and tribulations. Is our good friend successful or is he a bust? To find out, simply put panels 2 to 5 in chronological order. That is to say, start with panel 1, study clues in 2, 3, 4 and 5 and rearrange them to tell a story.

Solution: Story unfolds in this order—1, 4, 2, 5, 3.



Magic Age Formula 3934

Try this magic age formula right now, then save it for use at a party.

First, write the figure 3934 on a sheet of paper. Now ask a married friend to take a sheet of paper and a pencil, and without letting you see his or her notations, to add the following in a column:

The year of birth.
The year of marriage.
The number of years married.
Age.

When the addition is completed, show the paper upon which you have written the figure 3934. It will be the total he or she will have found in the addition. If it doesn't work out, someone is fibbing.

Let's Go Mountain-Climbing

Three men climbed separate mountains. Cooper climbed 846 ft. higher than Porter, who finished 350 ft. higher than Smith. The total distance they climbed was 11,176 ft. How high was each man's mountain?

Answer: Cooper, 4,406; Porter, 3,560; Smith, 3,210.

A Prime Question

Prime numbers are those divisible evenly only by themselves and one (six, for instance, is not a prime number, since it is divisible by 2 and 3). Can you tell, within two minutes, which of these are **not** prime numbers?

5, 7, 11, 13, 17, 19, 23, 37, 47, 53, 57?

Answer Quickly

Two numbers are in the ratio of 3 to 4. If seven is substracted from each of them, the remainders are in the ratio of 2 to 3. The numbers are under 50. What are they?

Room to Step Out?

Pat Murphy is doing an Irish jig on a rectangular dance floor. The length of the floor is one-third more than its width. The floor space measures 147 square feet. What are the dance floor's dimensions?

Chances are, you'll need pencil and paper for this one.

There's a Catch to This One

Ask someone to try to count from 10 to 5 backward quickly and see if he does it right.

Maybe you can't do it yourself. Try it before reading the comment below. There's a catch to it.

Name the Animal?

In ancient Egypt, certain animals were considered so valuable that there were laws against exporting them, killing one was punishable by death, and men shaved off their eyebrows in mourning when one died. What animal was that?

Answer: The cat.

Answer: To count from 10 to 5 backward correctly, you must start with 5.

Answer: It's 14 feet long by 10 feet 6 inches wide.

Answer: 21 and 28

Answer: Only 57 (divisible by 3 and 19) isn't a prime number.

Smart Gallery

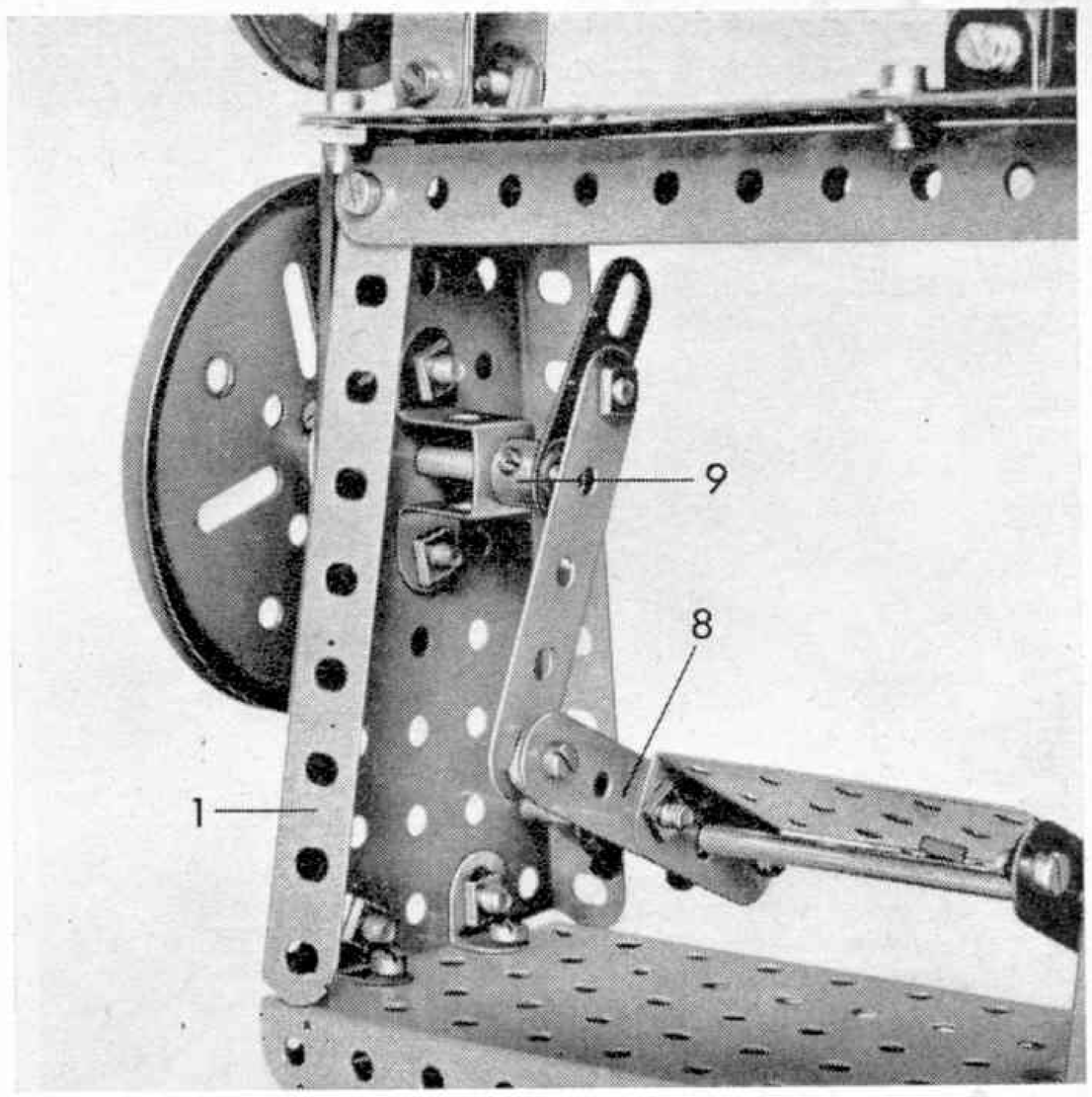
Use your wits and eyes to find a single error of factual circumstance in both drawings below, and then look for six differences in detail between Exhibit A and Exhibit B. Solution below.

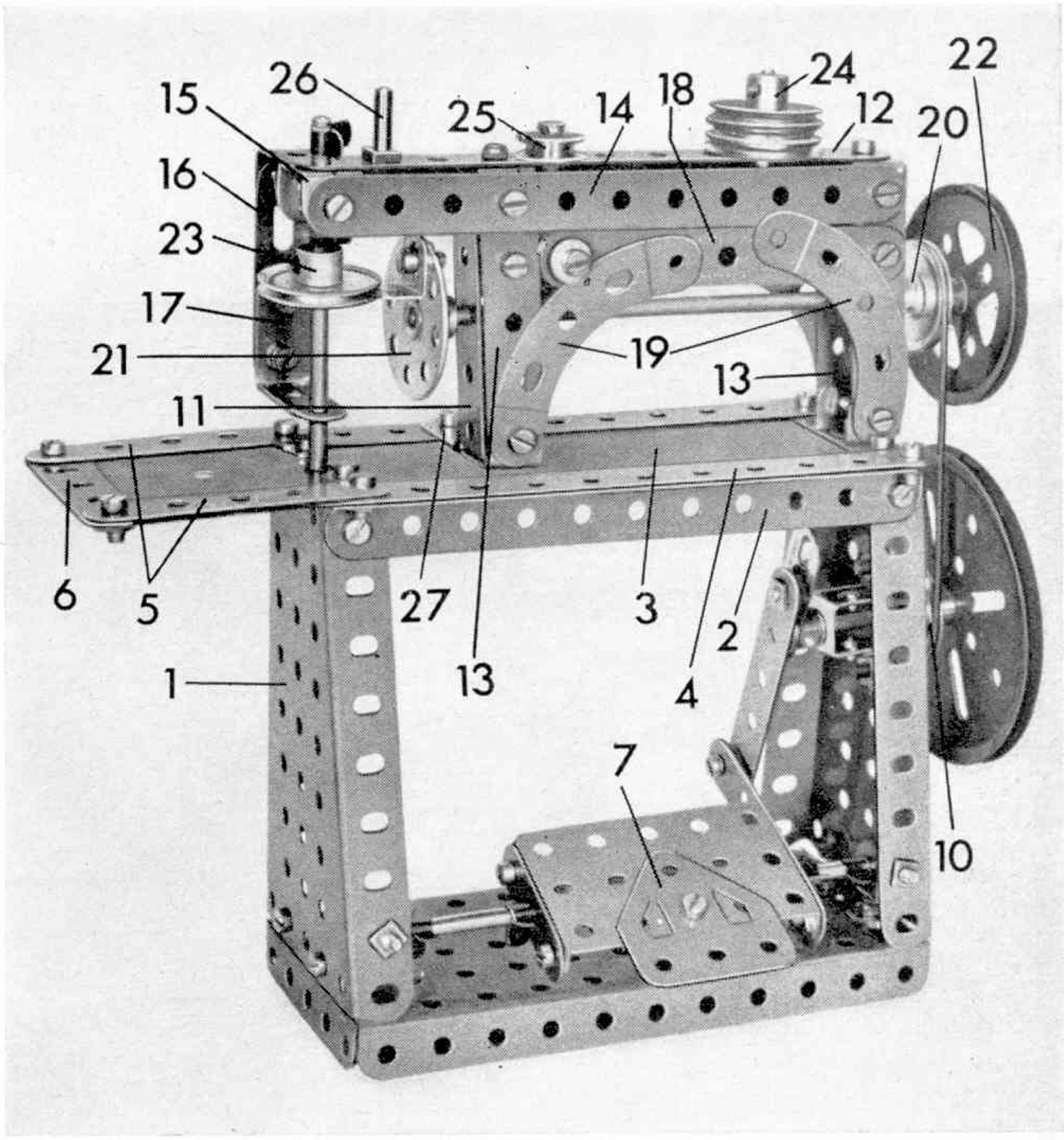
Factual discrepancy: Foot behind bench leg is in an impossible position. Detail differences: 1. Left man's mouth differs. 2. Hand of right man is repositioned. 3. One tree limb is missing. 4. Patch on left coat sleeve is smaller. 5. Hat at right is different. 6. There is one less backboard of bench.

SO SEW! SAYS SPANNER

Parts required

7 of No. 2	59 of No. 37A
2 of No. 3	55 of No. 37B
10 of No. 5	5 of No. 38
2 of No. 6A	1 of No. 45
2 of No. 10	2 of No. 48
6 of No. 11	2 of No. 48A
7 of No. 12	1 of No. 51
1 of No. 12A	1 of No. 52
1 of No. 12B	2 of No. 54
1 of No. 14A	1 of No. 55A
1 of No. 15	1 of No. 62
1 of No. 16B	4 of No. 90A
1 of No. 17	1 of No. 111
1 of No. 19B	1 of No. 111A
1 of No. 20A	1 of No. 111C
4 of No. 22	1 of No. 115
2 of No. 22A	1 of No. 126A
1 of No. 23	1 of No. 186A
1 of No. 24	1 of No. 190
6 of No. 35	1 of No. 192





SEWING machines don't seem to be the sort of things that are usually modelled in Meccano, yet I see no reason why this should be. After all, sewing machines incorporate some very interesting movements and it should be possible to reproduce nearly all these movements in a model. I'm not absolutely sure about the actual sewing operation itself, but all the basic movements can certainly be produced. In any case, it's an easy matter to build a model that *looks* like a sewing machine—even if it doesn't do everything done by the original—as is proved by the example described below. This was rebuilt from a 1934 issue of 'Meccano Magazine' and is featured here as a *simple* model, yet it is not only true to life, but also reproduces the major motions of the original.

The stand consists of a 5½ in. by 2½ in. Flanged Plate, to which two Flanged Sector Plates 1 are fixed by Angle Brackets. A 1½ in. by ½ in. Double Angle Strip is bolted across the top of each Sector Plate, between the flanges, at the same time fixing a 5½ in. Strip 2 between the Sector Plates at each side, as shown. A 7½ in. by 2½ in. compound flexible plate 3, obtained from a 5½ in. by 2½ in. and a 2½ in. by 2½ in. Flexible Plate, is then edged by two 5½ in. Strips 4, each extended by a 2½ in. Strip 5, and two 2½ in. Strips 6 and the whole thing is bolted to the 1½ in. by ½ in. Double Angle Strips.

Included in the stand is the treadle, which is obtained from a 2½ in. by 1½ in. Flanged Plate to which a Flat Trunnion 7 is fixed. One flange of this Plate is overlayed by a 1½ in. Strip, while the other flange is extended two holes by a 2½ in. Strip 8. Lock-nutted to this Strip is another 2½ in. Strip, the other end of which is also lock-nutted to a Crank 9 on a 2 in. Rod, journalled in one Flanged Sector Plate and a Double Bent Strip bolted to the Plate. Mounted on the Rod, outside the Plate, are a 1 in. fixed Pulley 10 and a 3 in. Pulley, the latter acting as a flywheel. The treadle, incidentally, is held by Spring Clips on a 5 in. Rod journalled in Angle Brackets bolted to the Flanged Sector Plates.

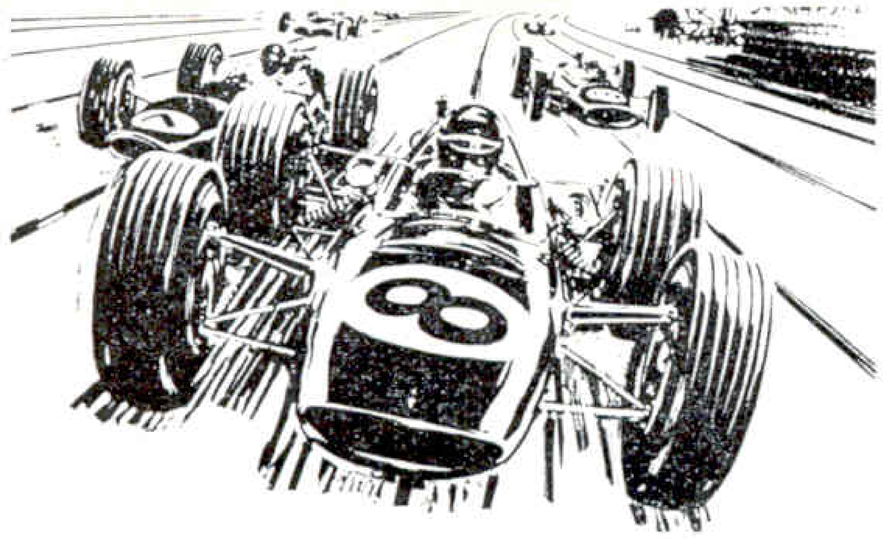
Moving on to the sewing machine proper, or 'machine head' as it is called, two 2½ in. by ½ in. Double Angle Strips 11 are joined by a 5½ in. Strip 12, at the same time fixing a Double Bracket to the upper lug of each Double Angle Strip. Four 2½ in. Strips 13 are then bolted to the side lugs of these Double Brackets, at the same time securing two 5½ in. Strips 14 between the Double Brackets. Another Double Bracket 15 is fixed to the end of these Strips, the outside securing Bolt also holding a fourth Double Bracket in place. A 2 in. Slotted Strip 16, to which a 1 in. by 1 in. Angle Bracket 17 is fixed, is bolted to the free lug of this last Double Bracket.

Bolted between corresponding Strips 13 are two 3½ in. Strips 18, each extended by a Fishplate, while a final curved shape is given by four 2½ in. Stepped Curved Strips 19, bolted to the lower ends of Strips 13 and at the same time fixing another Double Bracket between each pair of Strips. A 5½ in. Rod is now journalled in Double Angle Strips 11, being held in place by a 1 in. fixed Pulley 20 and an 8-hole Bush Wheel 21 to which an Angle Bracket is bolted. A 2 in. Pulley 22 is mounted on the outside end of the Rod to represent the handwheel used for starting the machine.

The needle is represented by a 3 in. Rod, journalled in Double Bracket 15 and Angle Bracket 17, that carries a 1 in. fixed Pulley 23. This Pulley should be so positioned on the Rod that, when Bush Wheel 21 revolves, the Angle Bracket fixed to it strikes against the Pulley, causing the 'needle' to move up and down. Spring Clips prevent the Rod from jumping out of its guides.

Finally, a bobbin is represented by two 1 in. loose Pulleys which are clamped on a ¾ in. Bolt by a 1 in. fixed Pulley 24, while a ½ in. loose Pulley 25 and a Threaded Pin 26 act as cotton guides. The machine head is then fixed to the stand by bolting one end direct to one 2½ in. Strip 6 and by attaching the other end to one 5½ in. Strip 4 with a 1 in. by ½ in. Angle Bracket 27. Pulleys 10 and 20 are connected by a 6 in. Driving Band.

KEEPING THINGS STRAIGHT



ALTHOUGH Christmas is gone, cold winter evenings are still with us and at such times a Scalextric set can provide excellent entertainment. Eventually, however, with a basic set it becomes a little too easy and a simple oval circuit can be learnt by heart.

If, in full size racing, you watch drivers of the calibre of Jim Clark approaching a corner in the company of other drivers who, although good, are not quite of world champion ability, the most obvious difference is in the braking distance required; I have seen Jim Clark driving a Lotus-Cortina at Brands Hatch and he was braking at least twenty-five yards later on the approach to Paddock Bend than other drivers in similar cars and this was reflected in his lap times. This same principle applies just as well in model car racing but the art of braking exactly the right amount in exactly the right place cannot be learnt on very small circuits.

The key to learning to drive really well lies, therefore, in having straights sufficiently long to enable high enough speeds to be attained so that definite braking, as opposed to easing off, is required. Any Scalextric circuit can be extended by the addition of pairs of straights and all the initial enlargement should be carried out in this way. It is very tempting to buy lots of bends and make up tight and twisty circuits, but not only does this retard the acquisition of driving skill but it means that one is not able to exploit the advantages of the Race Tuned cars, for these must have longish straights to give their best and using them on small circuits is frustrating and may also lead to eventual damage to controllers not matter how good these are.

The ideal way to extend a circuit is with some definite plan in mind and the diagrams give examples of the sort of plan that can be carried out, 'A' being the development of an oval circuit, with change-overs used for lane length equalisation, and 'B' a figure-eight.

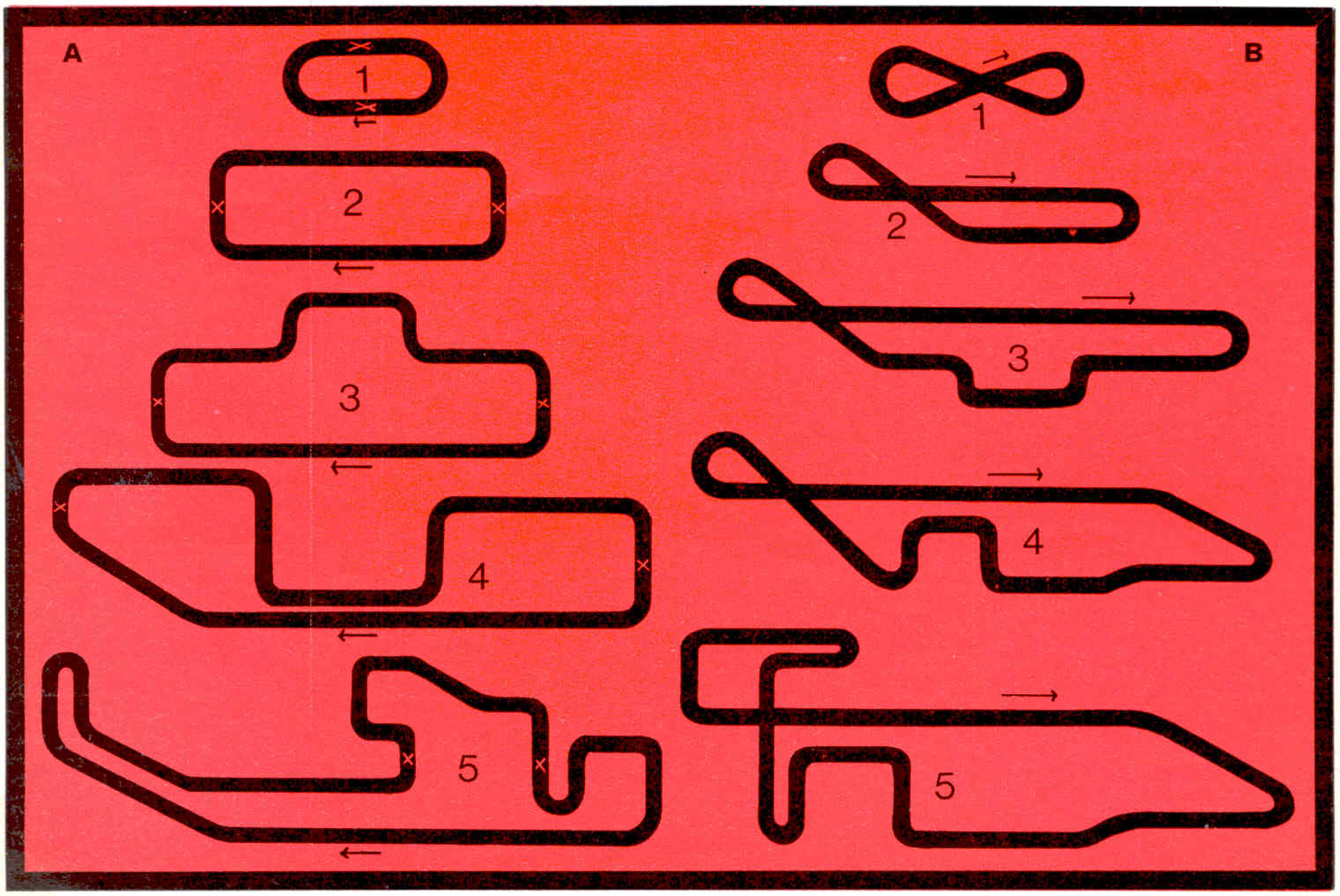
The five stage development plan has the same basis in each case, Stage 1 being the basic circuit. In Stage 2 the circuit is lengthened by adding straights only and the limit for this should be taken as most of the room available. In Stage 3 two extra double bends are added and the surplus straights made available by this used to lengthen the main straight still further. In Stage 4 a fast, sweeping bend is substituted at the end of the main straight and, to keep things fair for both lanes, track borders should be used here. Stage 5 is the final circuit, incorporating a fast bend, TWO hairpins, one taken on the outside lane and one on the inside, together with a variety of other corners. Always remember, especially when using change-overs, that any bend should have a complementary one where the car is on the other side of the track.

If you build up your layout in this way you will continue to get the fun out of it that you did from the start. You can, of course, add such hazards as chicanes and humpback bridges, but always keep these off that main straight, which is the part where your driving skill is really developed.

Frogflite Dornier 27 Continued from page 21

heavy, and so the smaller they are, the lighter will be the finished model and therefore, the better it will fly. Those supplied in the kit are light, but a bit undersize. For a better scale appearance the Dornier should have 1 in. diameter wheels but *don't* fit *solid* plastic 1 in. wheels—they will add a lot of performance-destroying weight. You can make a pair of balsa wheels if you like, using a short piece of aluminium tube for an axle bush, or you may be lucky and find a local model shop with some hollow 1 in. plastic wheels—these are lightweight and look very smart.

For the man who wants the ultimate, how about carving yourself a balsa propeller? Full instructions were given in the October 1966 issue of M.M. and although the plastic kit propeller (shown in our photo) gives a very good flight performance the full potential of this model is only realised with a balsa propeller and a free-wheel prop shaft when the performance is almost doubled! Finally a tiny drop of oil on the wheel axles and the propeller shaft will make everything run smoothly, and a little rubber lubricant (*not oil*) rubbed into the rubber motor will lengthen its life. When we came to balance our finished model, we found it to be a little nose-heavy. Instead of adding weight to tne tail we moved the rubber motor rear anchorage dowel 1¾ in. further back towards the tail. This alone was almost sufficient to completely correct the trim without increasing the all-up-weight and at the same time giving the rubber motor a better un-wound position. If you do this, don't forget to cement in place two extra 1/16th reinforcing doublers where the dowel passes through the fuselage. There are twelve different models in the Frogflite Quickbuild range each costing 7/6d. The two latest additions to the range are a Beagle and a Chipmunk, ask to see them at your local model shop.

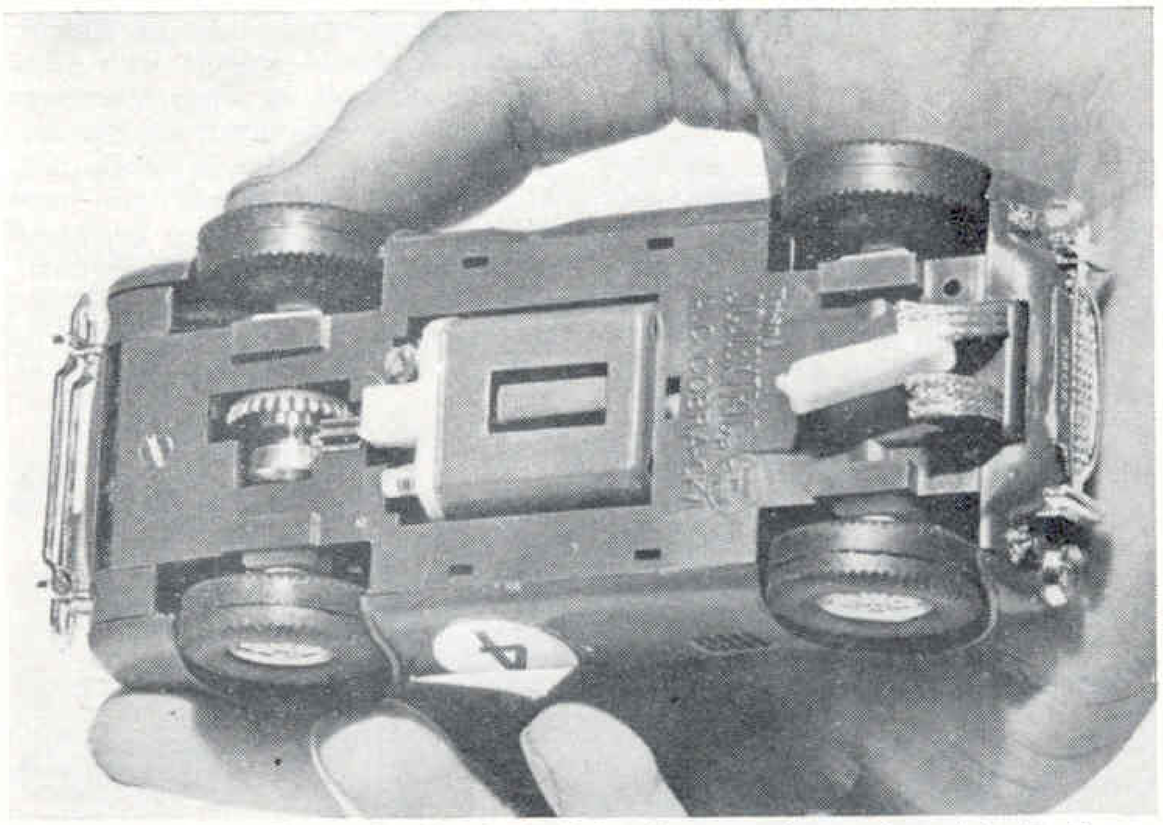


Stop press—from Scalextric

READERS who are 'Race Tuned' addicts, and those who are contemplating surprising their friends with a really hot car, will jump for joy at the latest kit from the Scalextric stable—the A.C. Cobra. Whilst justly renowned as a fine sports machine with excellent handling qualities, the real Cobra must surely be one of the nicest looking production cars in these days of angular styling, and a glance at the pictures on this page will prove that Scalextric have done full justice to the car's handsome appearance.

Construction of the Cobra is very similar to that of the Race-Tuned Porsche (described in the February M.M.) except that the body shell is in five parts instead of being a one-piece moulding. As in the Porsche kit, two rear axles are included with different gear ratios to suit different track conditions, and the axles can be changed in a matter of minutes. Two guide flags are also supplied.

The main body parts are moulded in British Racing Green and all the parts that should be chrome really are plated. A full transfer sheet and number plates give plenty of scope for originality, and a little careful use of the paint brush really repays the effort in making the car look 'different'.



The snake's belly! The underside of the Cobra is neat and smooth, and the big Race-Tuned motor, rear axle contrate gear, guide flag and pick-up braids can all be seen clearly in this photograph

Scalextric introduces 1/24th Scale

As we close for press, news is released of Scalextric Super 124, a revolutionary and entirely new slot race system.

Track is matt, non-skid black-surfaced, and **three** lane.

Completely new track joints; 12 simple pins to every one.

Stainless steel pick-up rails for **outdoor** use.

Plug in to any straight.

New wider slot for universal use.

The Ace G.T. and G.P. cars are super too. There will be a whole range available—sports and racing from Jaguar E types to Alfa Romeo Sports Saloons to a Ferrari V.8.

Forward mounted guide blades of new design on 'drop away' mountings.

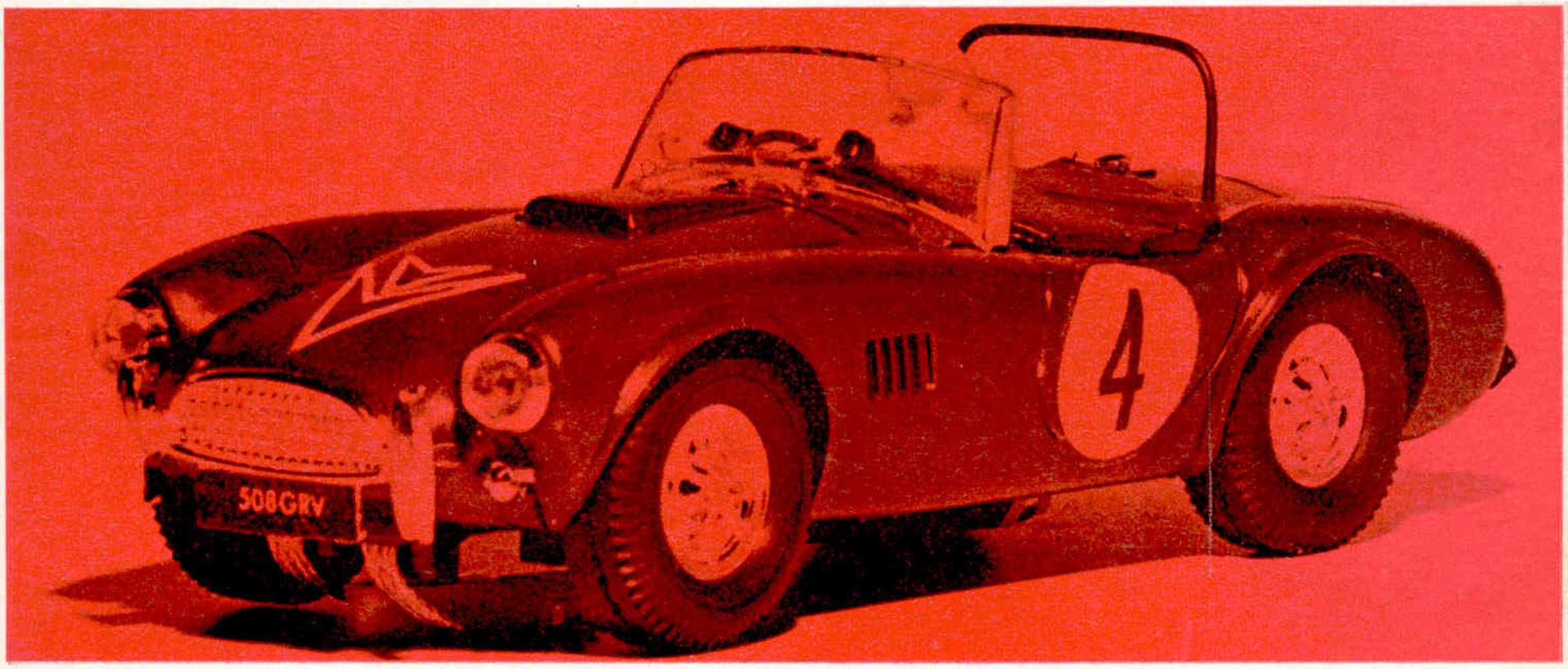
High hysteresis tyres.

Die-cast wheel hubs.

Bevel gears, and a whole host of precision extras.

More news in depth—as soon as it is available — will appear in Meccano Magazine.

Two views of the Cobra, showing its powerful and handsome appearance. The roll bar would prove to be of really practical value in protecting the driver and windscreen from damage in the event of a nasty prang!



AMONG THE MODEL BUILDERS

with 'spanner'

Drive Unit

WHILE 'Among the Model-Builders' is open to any item of interest from readers, emphasis has always been on useful mechanisms and gadgets, particularly those that can be adapted to suit individual requirements. This is because there are so many highly competent builders throughout the world designing mechanisms which might well prove invaluable to other enthusiasts, that an outlet for their ideas is essential if they are not to remain unknown.

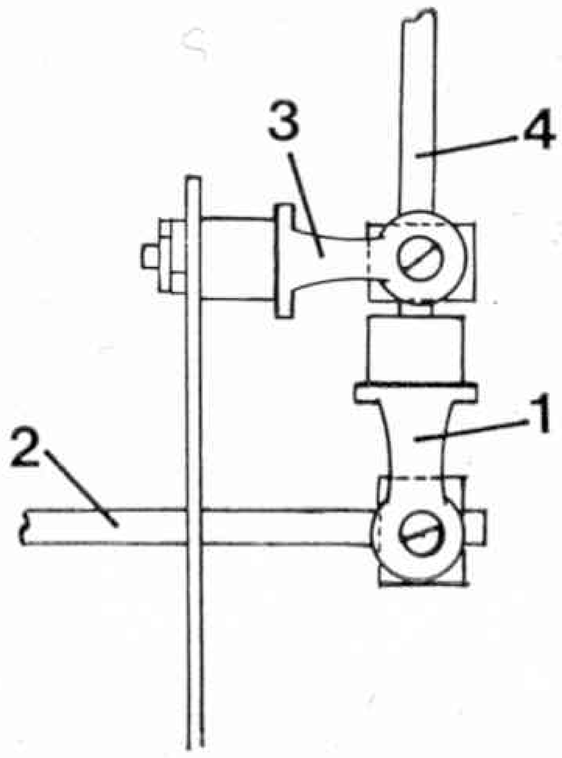
It's very satisfying to be able to solve all your own modelling problems, but this takes time as well as skill. It's far quicker—and easier—to pick up a copy of M.M. and find the problem solved for you!

Only recently I had occasion to find this out for myself. I had a hand-driven model and was thinking of ways to fit it with a motor and gearbox when I remembered I had been sent details of a very compact self-contained drive unit, consisting of an Emebo Motor and three-speed gearbox. I built it up and after a few slight modifications, found it suited my requirements admirably. You will find this modified version illustrated below, and I am sure it will prove equally as useful to readers.

Full credit for the unit goes to Mr. Andrew Cope of Heath End, Nr. Berkhamsted, Herts., who designed the original. The modified version illustrated, incidentally, is different only in that I have reversed the relative positions of two of the Gear Wheels and Pinions, to give step-down instead of step-up ratios, and have used alternative Bevel Gears to transmit the drive from the Motor to the Gearbox itself. It consists quite simply of a 5½ in. by 2½ in. Flanged Plate 1, to the flanges of which two 5½ in by 2½ in. Flat Plates 2 and two 2½ in. by 2½ in. Flat Plates 3 are bolted. An Emebo Motor, carrying a ⅞ in. Bevel Gear 4 on its output shaft, is fixed to the Flanged Plate 1 in the position shown. Bevel Gear 4 engages with another ⅞ in. Bevel Gear on a 3½ in. Rod held in Flat Plates 2 by a Collar and a ½ in. Pinion with ¼ in. face 5.

The sliding layshaft is a 4 in. Rod carrying a 57-teeth Gear 6, a ½ in. Pinion 7, a ¾ in. Pinion 8 and a 1 in. Gear 9. Gear 6 is positioned outside Flat Plate 2 and meshes with Pinion 5. A 3 in. Rod is journalled in Plates 2 and carries a 57-teeth Gear 10, a 50-teeth Gear 11 and a 1 in. Gear 12. These Gears and the gears on the layshaft must be positioned so that, when Gears 9 and 12 are in mesh, the remaining Gear Wheels are out of mesh.

Movement of the layshaft will bring Gears 9 and 12 out of mesh. A fraction after they disengage, Pinion 8 should engage with Gear Wheel 11, and as these disengage with further movement of the layshaft, Pinion 7 should mesh with Gear Wheel 10. At no time, however, must Gear Wheel 6 come out of mesh with Pinion 5. If required, the Unit can be completely enclosed by another 5½ in. by 2½ in. Flat Plate, as, indeed, was Mr. Cope's original mechanism.



Parts required:

1 of No. 15b	2 of No. 27a	1 of No. 59
2 of No. 16	2 of No. 30	2 of No. 70
1 of No. 25	2 of No. 31	2 of No. 72
1 of No. 26	18 of No. 37a	2 of No. 111c
1 of No. 26b	16 of No. 37b	1 Emebo
1 of No. 27	5 of No. 52	Electric Moter

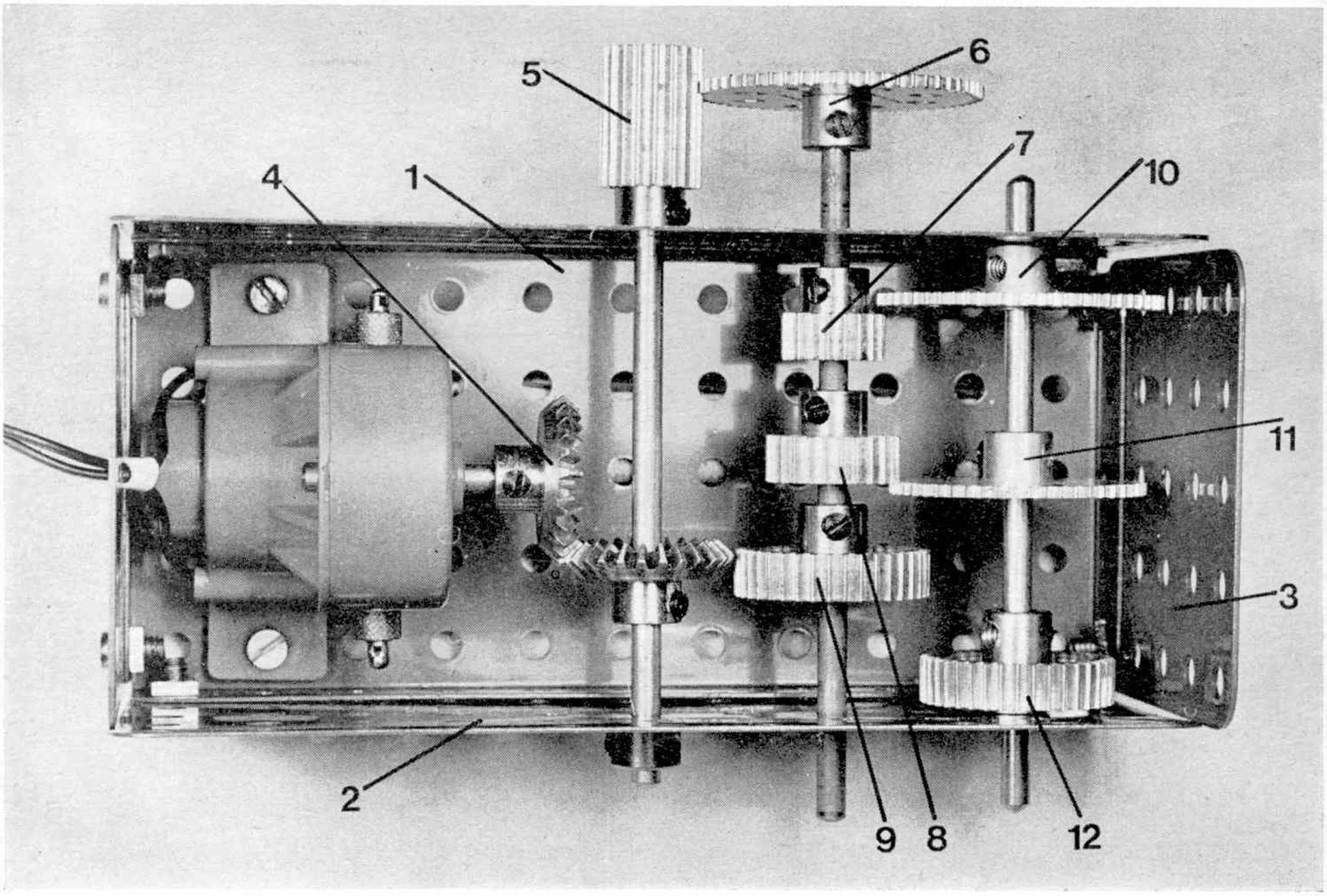
Gear Change Lever

You will see from the illustration of the Drive Unit, described above, that I have not fitted a gear change lever to the layshaft. The reason for this is that it is possible to build many different types of lever, and the most suitable would depend largely on the particular model in which the Unit is fitted. Perhaps the simplest idea of all is to mount a 1 in. Pulley with Rubber Ring or Motor Tyre on the end of the shaft, but, if you go in for more substantial things, you may like to use the type illustrated here.

To build it, a Swivel Bearing 1 is fixed on the end of the Layshaft 2 (see diagram), while another Swivel Bearing 3 is bolted to the side of the Unit. A suitable Rod 4 is then mounted loose in the 'spider' of Bearing 3, its lower end being fixed in the boss of Bearing 2. All very simple! It should be remembered, however, that a longer layshaft than that mentioned above must be used if this method is to be adopted.

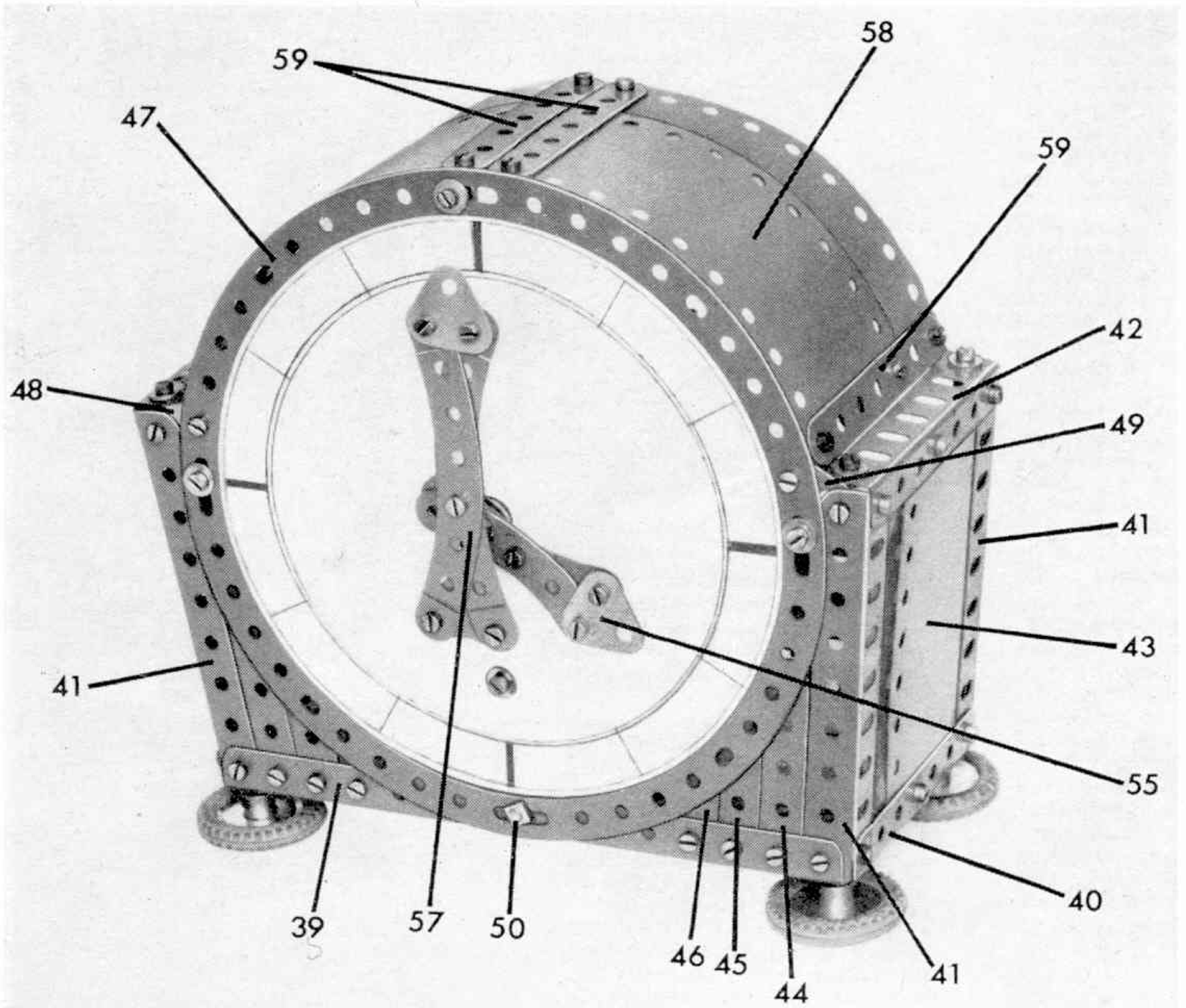
Parts required:

2 of No. 37a	1 of No. 111a	2 of No. 165
1 Rod of suitable length		



Build a Meccano Electric Clock

Time waits for no man, but Spanner, looking back through his files, found a handsome Electric Clock described in a thirteen year old MM! This month he shows how to build it in a slightly modified form.



CLOCKS always provide a challenge to the serious Meccano model-builder, a fact proved by the excellent reception given to the automatically-winding weight-driven clock we featured in these pages last year. In fact, clocks of all types are no strangers to Meccano Magazine, but it is many years since readers were given an effective electric clock to build. Indeed, the last clock of this type appeared in a 1954 issue of the 'M.M.', so I felt it was about time we featured another example and you will find this described below. Actually, it is not strictly correct to describe the model as 'another' example, as it is really a modified version of the model featured in 1954, but I doubt if many of today's readers will have seen the original.

The problem with electric clocks, of course, is obtaining a motor that will run at a constant speed irrespective of voltage changes and, luckily, a synchronous motor will do just that. A motor of this type runs from Alternating Current at a speed governed by the fluctuations of the electricity supply frequency, the actual speed depending on the number of 'poles' possessed by the motor. Provided the power source has sufficient voltage to drive the motor, changes in voltage will not affect its speed, as the number of cycles per second inherent in the electrical supply does not alter.

Framework

First to be built should be the chassis or framework for the motor and gearing. This, in fact, can be completed quite independently of the case and can be fitted as a whole into the case when finished. To begin with, two $7\frac{1}{2}$ in. Strips 1 are bolted to a $5\frac{1}{2}$ in. by $3\frac{1}{2}$ in. Flat Plate 2, a distance of one hole separating them. The Bolts holding the lower of these Strips are also used to fix two $1\frac{1}{2}$ in. by $\frac{1}{2}$ in. Double Angle Strips to the other side of the Plate, one at each edge, and a $1\frac{1}{2}$ in. Flat Girder 3 is bolted to each of these Double Angle Strips. Situated in the centre of the gap between Strips 1, and also bolted to Flat Plate 2, are two $1\frac{1}{2}$ in. Strips 4 which will later provide an extended bearing for the motor mainshaft.

Attached to the ends of each Strip 1 are two $1\frac{1}{2}$ in. Double Angle Strips, the free lugs of which are joined by another $7\frac{1}{2}$ in. Strip 5, then Strips 5 are themselves joined by a 3 in. by $1\frac{1}{2}$ in. Flat Plate 6, protruding a distance of two holes beneath lower Strip 5. Fixed to the inside of this Flat Plate, in the gap between Strips 5, are another two $1\frac{1}{2}$ in. Strips which will later provide the other extended bearings for the motor mainshaft.

Bolted to the inside of Flat Plate 1, one at each corner, are four $1\frac{1}{2}$ in. by $\frac{1}{2}$ in. Double Angle Strips 7, the free lugs of which are connected as shown by two $5\frac{1}{2}$ in. Strips 8 and two $3\frac{1}{2}$ in. Strips 9. A further two $3\frac{1}{2}$ in. Strips 10 are fixed between Strips 8, the securing Bolts passing through the second holes from the tops of Strips 8, while another three $3\frac{1}{2}$ in. Strips 11 are fixed between the centre holes of Strips 8. Two

1½ in. Angle Girders 12 joined by a 3½ in. by ½ in. Double Angle Strip 13, are bolted to the inside of Flat Plate 2.

Gearing

Journalled in Strips 10 and Flat Plate 2 is a 2 in. Rod held in place by a 50-teeth Gear 14 and a ¾ in. Pinion 15, mounted one each side of the Flat Plate. Pinion 15 engages with a 50-teeth Gear fixed, along with a ½ in. Pinion 16 and a Collar, on another 2 in. Rod journalled in the centre holes of Strips 10 and Flat Plate 2, the Gear Wheel and Collar holding the Rod in place. Gear Wheel 14, on the other hand, engages with a ¾ in. Pinion 17 on a 2 in. Rod journalled in Flat Plate 2, Double Angle Strip 13 and a 1½ in. Flat Girder 18, bolted to corresponding Strip 8. This Rod also carries a 1 in. Gear 19, between the Flat Plate and the Double Angle Strip, and a 1 in. Pulley with rubber Ring 20 and a 50-teeth Gear Wheel 21 between the Double Angle Strip and the Flat Girder. Note that Pulley 20 is clamped tight against Gear 21, the latter being loose on the Rod.

Mounted in the centre hole of Double Angle Strip 13 and Flat Plate 2 is a 4½ in. Rod 22, which protrudes about two inches in front of the Double Angle Strip. On this Rod is fixed a 1 in. Gear, in mesh with Gear 19, while mounted loose on the Rod is a 57-teeth Gear 23, spaced from the Double Angle Strip by three Washers and in mesh with Pinion 16. The boss of Gear Wheel 23 is held in one end of a Socket Coupling 24, which is also loose on the Rod. At a later stage this "loose" assembly will be held in place by the minute hand of the clock as will be seen.

Still on the gearing, another 2 in. Rod 25 is journalled in the very centre hole of Flat Plate 2 and in the corresponding holes of Strips 11, a 3½ in. Strip having first been bolted across the inside of Plate 2 to provide an extended bearing for the Rod, which is held in place by a ½ in. Pinion 26 and a 57-teeth Gear 27. Also journalled in Strips 11 and Face Plate 2 is yet another 2 in. Rod held in place by a Collar and a ¾ in. Pinion 28 and carrying a 50-teeth Gear 29 in its centre. Gear 29 engages with a Worm 30 on a 4 in. Rod held by Collars in 1½ in. Flat Girders 3. Towards the other end of this Rod is a further 50-teeth Gear, which engages with another Worm 31, fixed on a 4 in. Rod 32 also journalled in Strips 11 and Flat Plate 2, a Collar holding it in place. Fixed on the Rod outside the Flat Plate is a 57-teeth Gear Wheel 33 that meshes with Pinion 26.

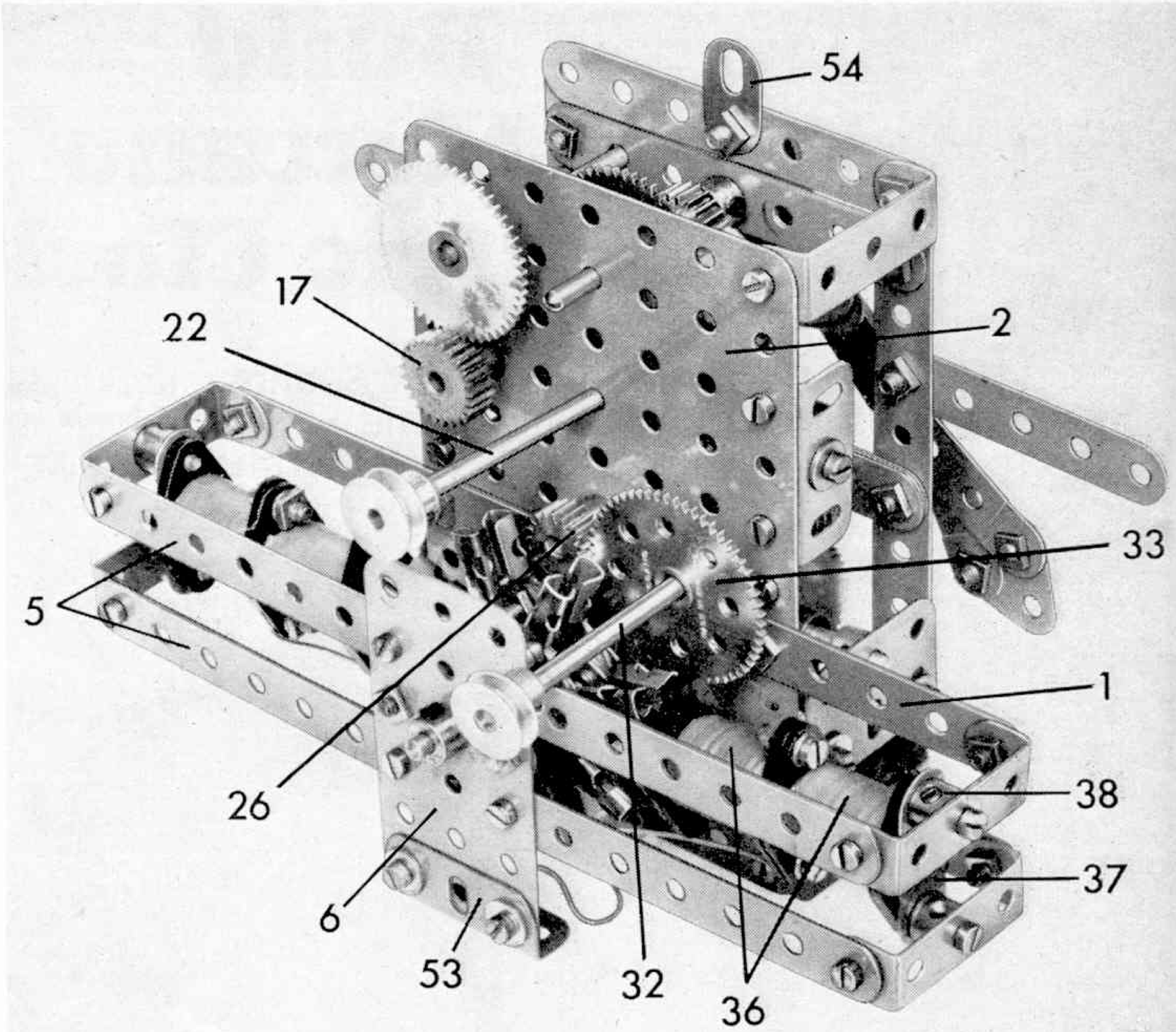
Motor

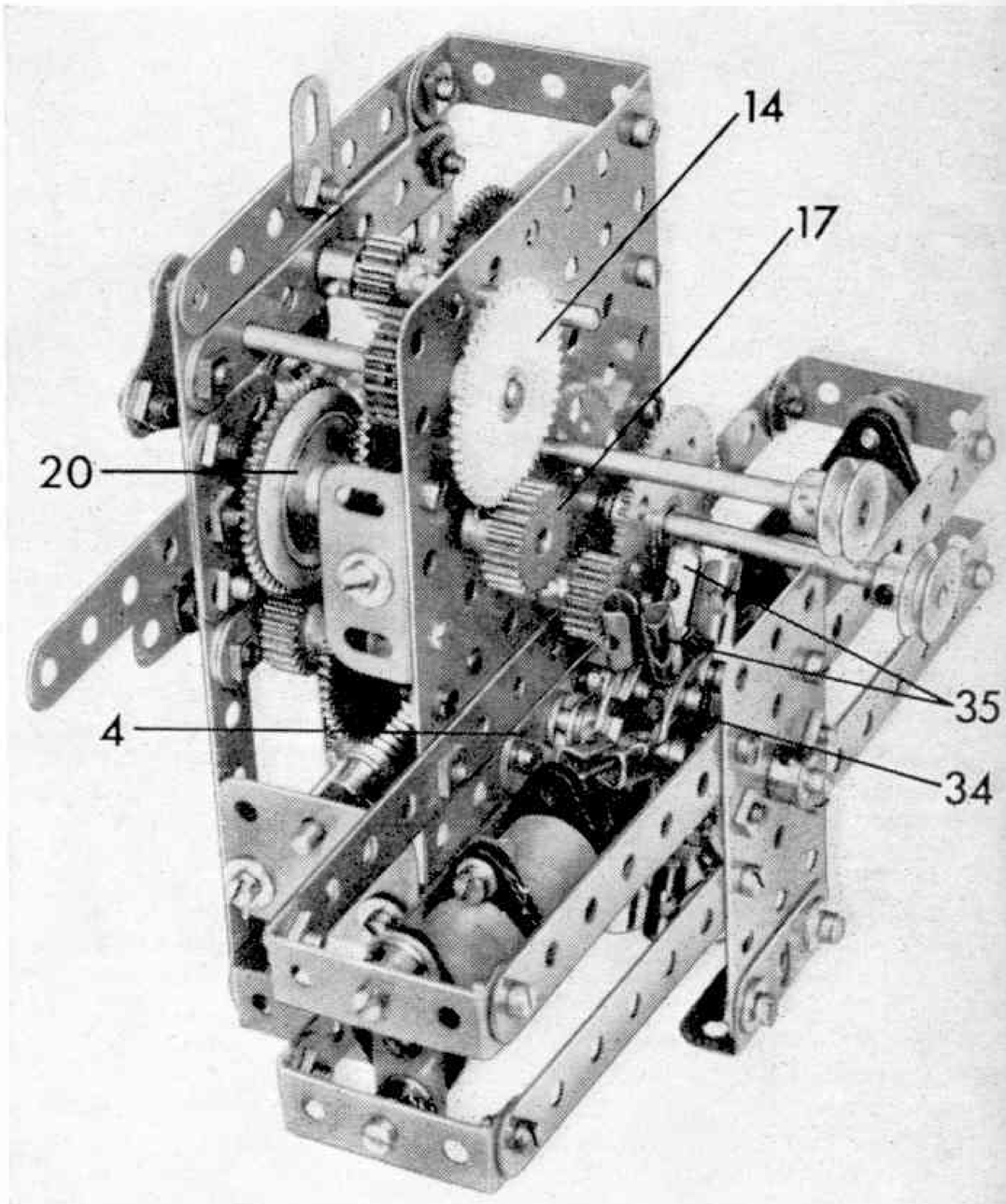
As already mentioned, the driving motor is of the synchronous type consisting of a special built-up wheel or 'rotor' revolving between two electro-magnets. Two Bush Wheels 34, each with eight Rod and Strip Connectors 35 bolted at equal angles to its face, are fixed on a 2½ in. Rod, journalled in Flat Plates 2 and 6 with three Washers spacing the inside Bush Wheel from Strips 4. The Bush Wheels must be so arranged that corresponding Rod and Strip Connectors lie in identical positions with perhaps 1/12 in. separating them. The Rod is held in place by a Collar outside Plate 6 and by a ½ in. Pinion inside Plate 2, this Pinion meshing with Gear Wheel 27.

Two electro-magnets are now each built up from two Cylindrical Coils 36 (Elektrikit part No. 522), fixed together, with their contacts joining, by ⅜ in. Bolts. The 'E' terminal of one Coil must be in contact with the 'S' terminal of the other. Two 1 in. Cylindrical Cores (Elektrikit part No. 528) are joined together by a 1 in. Screwed Rod and are attached to a 1½ in. Strip 37 by a Bolt passed through the centre hole of the Strip and screwed into one of the Cylindrical Cores. The whole unit is then attached to the Double Angle Strips, bolted between Strips 1 and 5, by ½ in. Bolts, with a Washer and a Collar 38 on the shank of each Bolt acting as spacers. Finally, ½ in. Pulleys with boss are fixed on the ends of Rods 22 and 32.

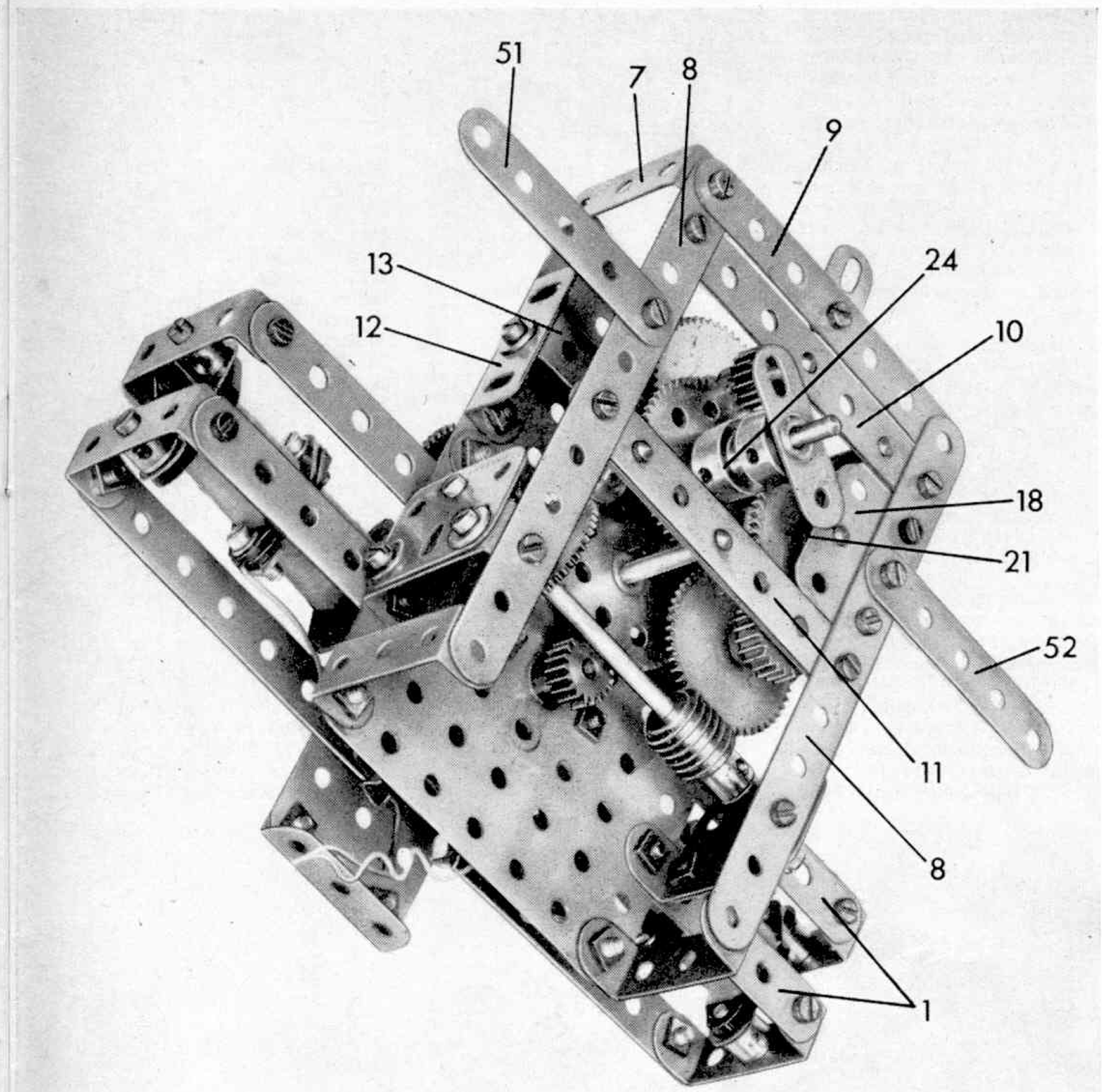
Case

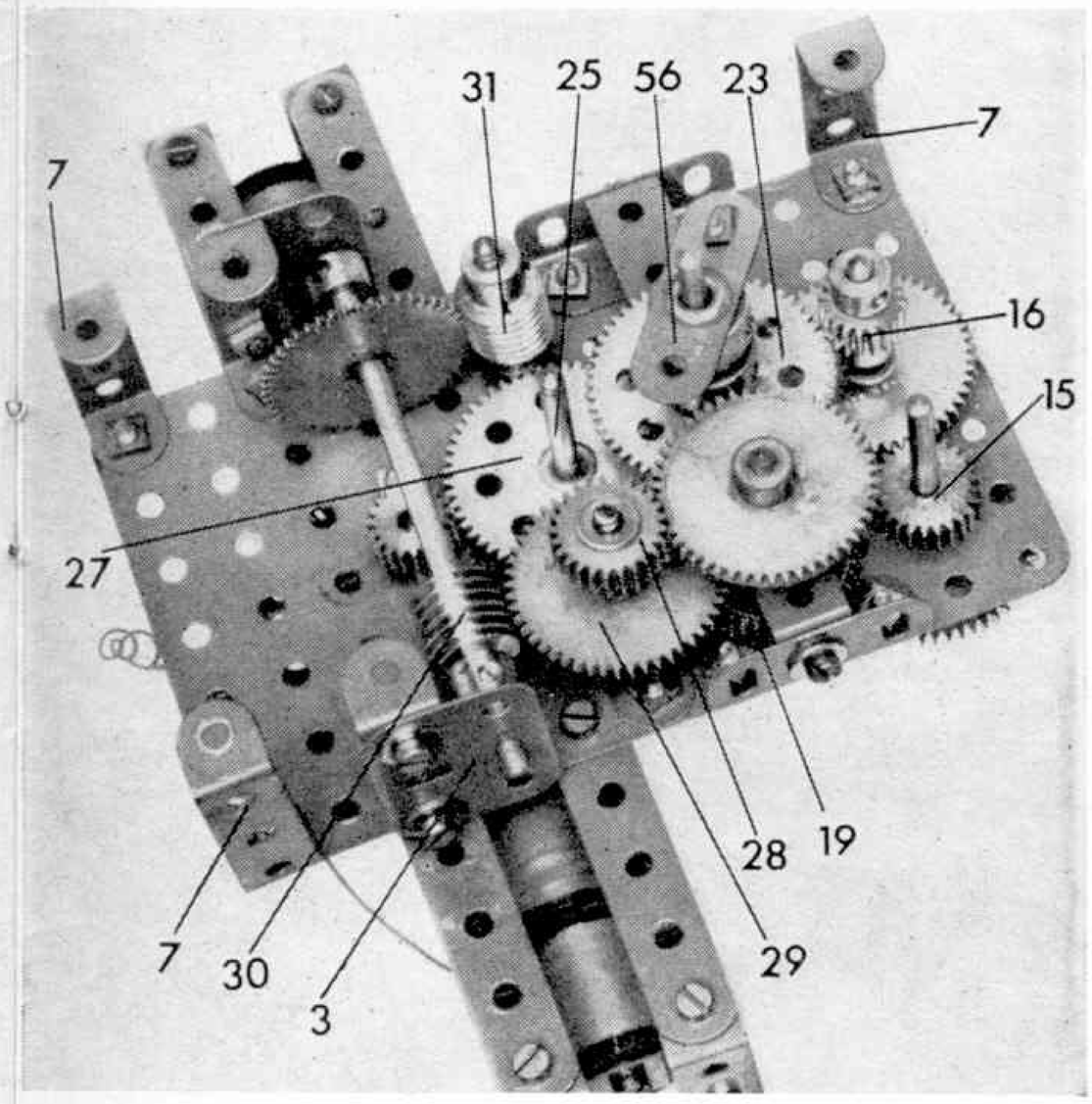
The completed mechanism can, of course, be fitted in any suitable case but we have chosen a typical mantel clock design. A compound 7½ in. by 3½ in. flat plate, obtained from two 5½ in. by 3½ in. Flat Plates overlapped seven holes, is edged along three sides by a 7½ in. Angle Girder 39 and two 3½ in. Angle Girders 40. Fixed at each corner is a 4½ in. Angle Girder 41, then the tops of each pair of these Angle Girders are joined by a 3½ in. Angle Girder 42,





Top: the 'works' of the clock before being mounted inside the case. In this view lower 3½ in. Strip 9 has been removed. Above: a rear view of the Clock mechanism showing the synchronous motor, built up from standard Meccano and Elektrikit parts





Top: another view of the motor. Note the friction drive to the hands, which enables the hands to be set without affecting the motor. Above: in this view of the drive mechanism the front framework has been removed to show the layout of the gears

the resulting space being enclosed by two 4½ in. by 2½ in. Flexible Plates 43.

Bolted to each end of Angle Girder 39, and running in order from Angle Girder 40, are a 2½ in. Strip 44, a 1½ in. Strip 45 and a 1 in. Corner Bracket 46. A 7½ in. diameter Circular Strip 47 is then attached to Girders 40 by two Fishplates 48 and 49 fixed between the Circular Strip and the upper holes of the Angle Girders.

At this stage the mechanism should be fixed in position, but first of all, a 2 in. Strip should be attached to the centre of lower Strip 9 by a ⅜ in. Bolt 50, the shank of the Bolt pointing forwards. The mechanism is then positioned in the case with the shank of Bolt 50 protruding through the centre hole of Girder 39 and the corresponding hole of Circular Strip 47, and a Nut is added. In addition two 2½ in. Strips 51 and 52 are bolted between Strips 8 and Circular Strip 47. Also, a 1½ in. Angle Girder 53 is bolted to the bottom of Flat Plate 6 and the horizontal flange of this rests on the compound 7½ in. by 3½ in. Flat Plate, but note that it is not bolted to the compound flat plate. A circular disc, a fraction under 6½ in. diameter is cut out of stiff cardboard, is marked up to make the face of the clock and is fixed in position by bolting it to the top of Strip 49. It is also bolted to a Fishplate 54 attached to the centre of upper Strip 9.

An hour hand is built up from two 2½ in. Curved Strips joined at one end by a 1 in. Triangular Plate 55. The other ends are overlapped so that the second holes in the Strips are in line, then a Double Arm Crank 56 is bolted to them with its boss in line with the second holes. The completed hand is mounted loose on Rod 22, but with the boss of the Double Arm Crank fixed in the outer end of Socket Coupling 25.

The minute hand is built up from two 4 in. Stepped Curved Strips 57, joined at one end by a 1 in. Triangular Plate and at the other end by a 1 in. Corner Bracket. A Crank is bolted to the underside of the Curved Strips and is then tightly fixed on the very end of Rod 22. The boss of Double Arm Crank 56 should not be clamped so tightly against the hour hand that it causes friction when the hands revolve.

Lastly, a 10 in. by 3½ in. compound Flexible Plate 58 is built up from four 5½ in. by 2½ in. Flexible Plates overlapped as shown by four 3½ in. Strips 59, then the complete unit is curved to shape and is attached to Angle Girders 42 by Obtuse Angle Brackets. It is also attached to the top dead centre of Circular Strip 47 by an ordinary Angle Bracket.

Wiring

Wiring of the model is simple. The lower terminals of each electro-magnet are connected together by a length of wire whereas the upper terminals of the electro-magnets are connected individually, one to one terminal of the power source and the other to the other terminal of the power source. The power source itself should give 15 volts AC. To start the clock, the Pulley on the end of Rod 32 should be turned until the wheel built up from Bush Wheels 34 is revolving at a speed 'synchronous' with the AC current, i.e. 750 r.p.m. Once this speed is attained the clock should continue working under its own power.

Before the model will operate at its best, you will probably find that a certain amount of adjustment is required. The things to be checked and adjusted if necessary are the positions of Rod and Strip Connectors 35 in relation to each other and the distance of the Rod and Strip Connectors from the Cores of the electro-magnets. Of course, all moving parts, particularly the built-up wheel, must be as free from friction as possible.

Parts required

4 of No. 1b	2 of No. 23a	2 of No. 77
2 of No. 2	2 of No. 24	2 of No. 82
11 of No. 3	3 of No. 25	2 of No. 89b
4 of No. 5	3 of No. 26	2 of No. 90
1 of No. 6	5 of No. 27	3 of No. 103h
8 of No. 6a	3 of No. 27a	8 of No. 111a
1 of No. 8b	2 of No. 31	8 of No. 111c
4 of No. 9a	2 of No. 32	3 of No. 133
4 of No. 9b	130 of No. 37a	4 of No. 142c
3 of No. 9f	120 of No. 37b	1 of No. 145
3 of No. 10	40 of No. 38	1 of No. 155
5 of No. 12	10 of No. 48	1 of No. 171
1 of No. 15a	1 of No. 48b	4 of No. 191
2 of No. 15b	3 of No. 52a	4 of No. 192
1 of No. 16a	9 of No. 59	16 of No. 212
3 of No. 17	1 of No. 62	4 of No. 522
1 of No. 18a	1 of No. 62b	4 of No. 528
5 of No. 22	1 of No. 73	

A Travelling Gantry Crane by Spanner

HERE is an example in Meccano of a type of crane that is perhaps less well known than most cranes in common use today. It's based on what is known as a 'Travelling Gantry Crane' and is usually found in heavy industries where really substantial loads are to be moved some distance. In the shipbuilding industry for example, gantry cranes are often used to carry whole prefabricated sections of ships from one location to another.

Generally speaking, cranes of the type in question consist basically of two towers connected at the top by a strong cross-beam or 'gantry', the whole assembly running on parallel rails. The actual load hook is slung from a small trolley or 'crab', which runs along the gantry itself. The Meccano model described here is a typical example of this type of machine and, although none are shown, it runs on rails that can be built up from suitable Angle Girders. It is powered by a Meccano E15R Electric Motor and is fitted with a particularly useful gearbox that controls movement not only of the crane as a whole, but also of the crab and load-hook.

Towers and Gantry

Construction of the model should begin with the towers or, to be more specific, the tower bases, both of which are different. The smaller of the two is built up from two 9½ in. Angle Girders to each of which a 9½ in. by 2½ in. Strip Plate 1, edged by two 9½ in. Strips 2 and two 2½ in. Strips 3, is bolted to complete the side. The sides are joined at each end by a 2½ in. by 2½ in. Flexible Plate 4, attached to the sides by Angle Brackets and edged by four 2½ in. Strips 5. Now bolted to each side are two 12½ in. Angle Girders 6 and 7, joined by a 2½ in. Strip 8 and braced as shown by two 5½ in. Strips 9.

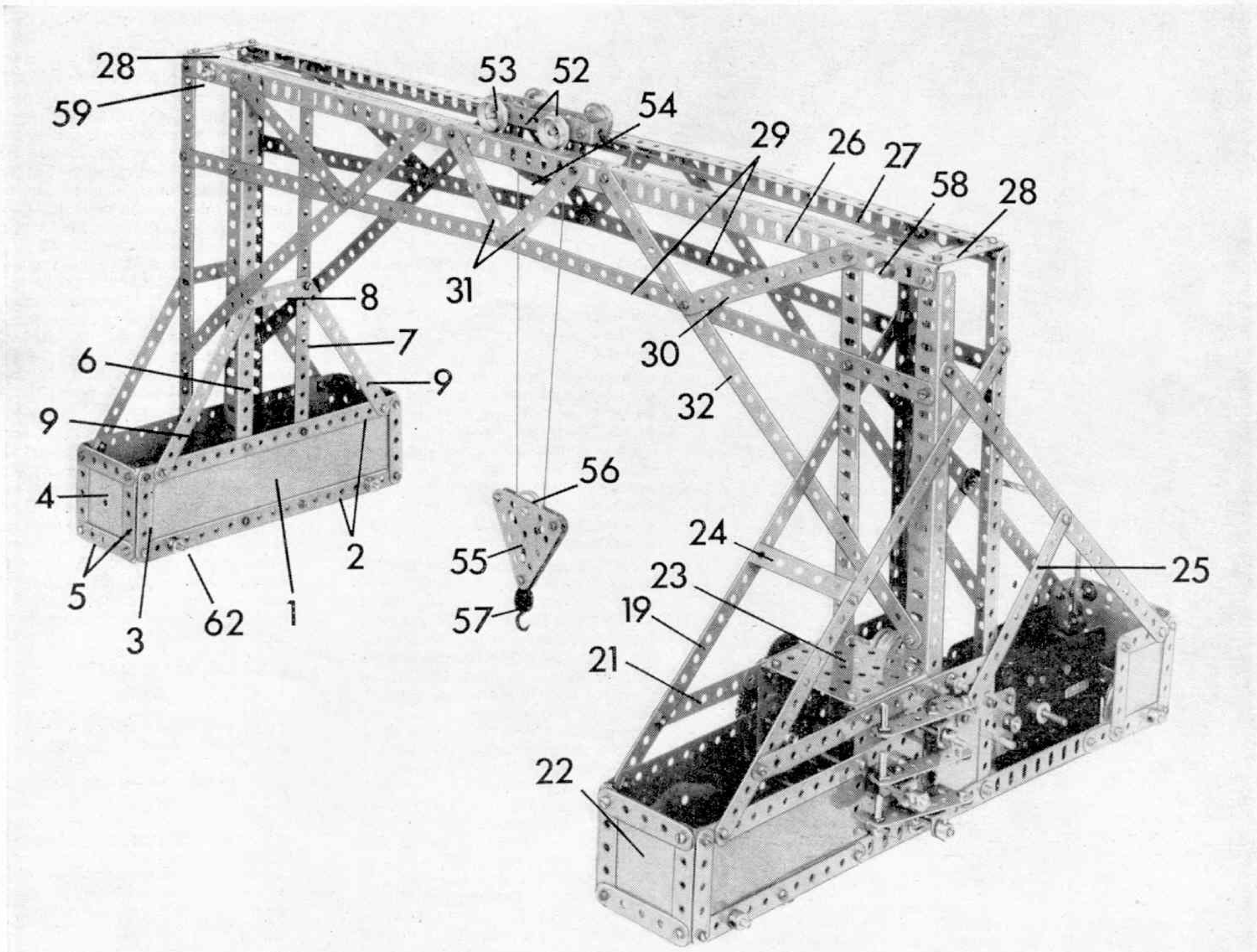
The larger tower base holds the E15R Electric Motor as well as the gearbox and is therefore considerably more complicated. Two 12½ in. Angle Girders 10 are each extended at one end by a 5½ in. Strip 11 and at the other by a 3½ in. Strip 12, the former projecting five holes and the latter projecting four holes. Now bolted to each extended Angle Girder are a 5½ in. by 2½ in. Flexible Plate 13, a 5½ in. by 3½ in. Flanged Plate 14, two 12½ in. Angle Girders 15 and 16, separated by a 2½ in. by 2½ in. Flexible Plate 17 edged by a 2½ in. Strip, and another 2½ in. by 2½ in. Flexible Plate 18 edged by three 2½ in. Strips. Flexible Plate 13, incidentally, is edged by a 2½ in. Strip and a 5½ in. Strip which is connected to Angle Girder 16 by a 12½ in. Strip 19, then another 12½ in. Strip 20 is bolted between Angle Girder 15 and Flexible Plate 18.

Strip 19 is connected to Flanged Plate 14 and Angle Girders 15 and 16 by a compound 8½ in. strip 21 obtained from two 5½ in. Strips. As in the case of the smaller tower base the sides are joined at each end by a 2½ in. by 2½ in. Flexible Plate 22 edged by 2½ in. Strips and attached by Angle Brackets. In addition a 2½ in. Strip is bolted between Girders 10 while a 2½ in. by 2½ in. Flat Plate 23 is bolted between Flanged Plates 14. Also, Strips 19 are joined by a 2½ in. by ½ in. Double Angle Strip 24, as also are Strips 20, further bracing being supplied in both cases by 5½ in. Strips 25.

The gantry itself can now be built up. Girders 6 in the smaller tower are connected together and to Girders 15 in the larger tower by a 24½ in. Angle Girder 26, while a similar Angle Girder 27 is fixed between Angle Girders 7 and 16. Girders 26 and 27 are themselves joined at their ends by 2½ in. Strips 28. Two 24½ in. compound strips 29 are each built up from two 12½ in. Strips, to be bolted between Angle Girders 6 and 15 and 7 and 16, respectively. Bracers are then provided by two 5½ in. Strips 30, two 3½ in. Strips 31 and two 12½ in. Strips 32, the last also bolted to the towers.

Motor and Gearbox

The sideplates of an E15R Motor are extended by two 1½ in. by 1½ in. Flat Plates in which a 4 in. Rod is held by Angle Brackets. Mounted on this Rod is a ¾ in. Sprocket Wheel 33 and a 57-teeth Gear Wheel 34, the latter in mesh with a ½ in. Pinion on a 2½ in. Rod journalled in the Motor sideplates. Also fixed on this Rod is another 57-teeth Gear



35 in mesh, in turn, with a ½ in. Pinion on the Motor output shaft. The complete unit is then bolted to Girders 10 having first extended the Motor switch with a Rod and Strip Connector in which a 1½ in. Rod is fixed.

Moving on to the gearbox, this controls movement not only of the gantry as a whole, but also of the load hook and the small travelling trolley or 'crab' on top of the gantry. Flanged Plates 14 provide the bearings for all the Rods featured in the unit. To begin with, Sprocket Wheel 33 is connected by Chain to a 2 in. Sprocket Wheel 36 on a 4 in. Rod, held in place by a ¼ in. Pinion 37 and a Collar outside the Plates, and carrying a ½ in. Pinion 38 inside the Plates. This Rod is actually one of the only two fixed Rods used in the gearbox, the other being a 3½ in. Rod 39, carrying a 57-teeth Gear 40 and a 1 in. Sprocket Wheel 41 and held in place by Collars.

The remaining three gearbox Rods are all sliding, being controlled by levers at the side. The uppermost of the three is a 5 in. Rod 42 carrying a 50-teeth Gear Wheel 43 on its end and a Cord Anchoring Spring between the Flanged Plates. The centre of the three is also a 5 in. Rod 44 that carries a 57-teeth Gear 45 and a ½ in. Pinion 46 between the plates while the last of the three is a 4½ in. Rod carrying another 50-teeth Gear 47 on its end and a ½ in. Pulley with boss 48 between the Plates. All three Rods are controlled in a similar manner by a Double Bracket 49 held between Collars on the free ends of the Rods. A 3 in. Strip, with a Threaded Pin 50 fixed at one end, is lock-nutted to the Double Bracket and to a 1 in. by 1 in. Angle Bracket 51 bolted to outside Angle Girder 15.

By moving Rod 42 Gear Wheel 43 can be brought into mesh with Pinion 37, whereas partial movement of Rod 44 should bring Gear 45 in mesh with Pinion 38. Further movement of Rod 44 should bring Pinion 46 in mesh with Gear Wheel 40, Gear 45 remaining in mesh with Pinion 38. Movement of the third sliding Rod should bring Gear Wheel 47 in mesh with Pinnion 37.

Crab and Hook

Two 3½ in. Strips 52, joined at each end by a Double Bracket, provide the chassis for the 'crab'. Journalled in the Strips are two 2 in. Rods each held in place by two ¾ in. Flanged Wheels 53, and carrying between the Strips, in order, two Washers, a 1½ in. Strip, a Collar, another 1½ in. Strip and two Washers. A ½ in. loose Pulley is mounted on a ½ in. Bolt held by two Nuts in the lower end holes of the 1½ in. Strips, at the same time fixing two 2½ in. Stepped Curved Strips 54 between the 1½ in. Strips on each Rod.

In the case of the load hook, two 2½ in. Triangular Plates 55 are joined together by two ⅜ in. Bolts, but are spaced apart by a Collar on the shank of each Bolt. Mounted between the Plates on another ⅜ in. Bolt is a 1 in. loose Pulley 56, which must be free to turn, while a Loaded Hook 57 is fixed at the apex on a ½ in. Bolt held by two Nuts.

Stringing

Before stringing can actually begin, two 3½ in. Rods 58 and 59 are journalled in Girders 26 and 27, being held in place by Collars. Rod 58 carries three ½ in. loose Pulleys between the Girders while Rod 59 carries only one ½ in. loose Pulley Another 3½ in. Rod 60, carrying three 1 in. loose Pulleys 61, is journalled in compound strips 21.

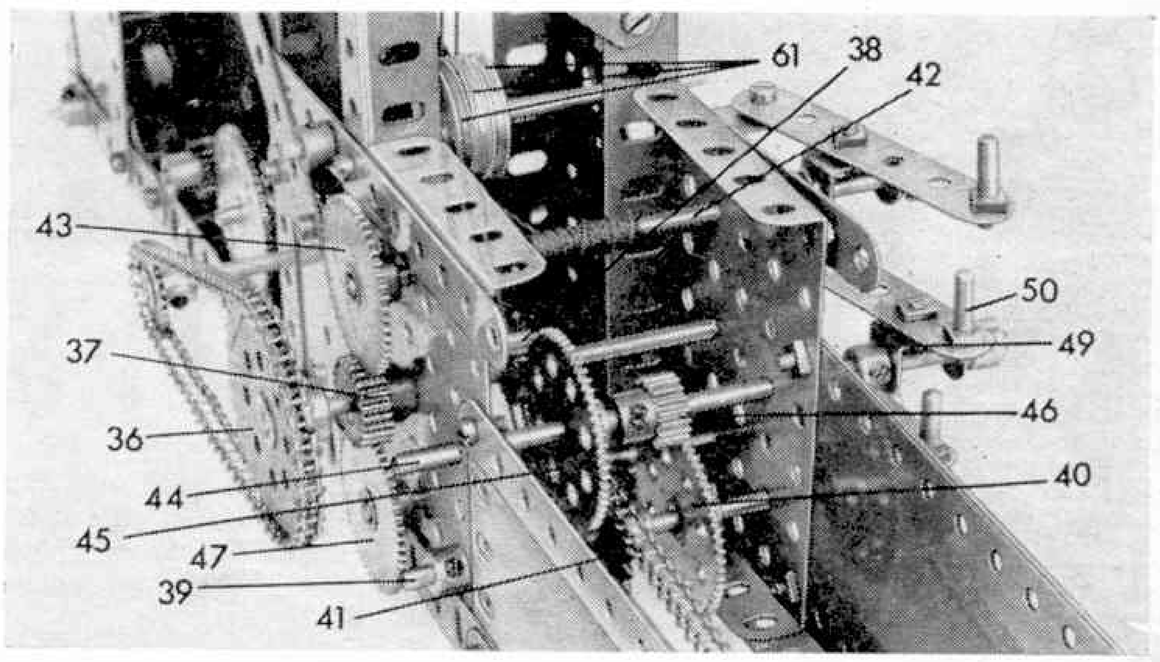
A length of Cord is now tied to the Double Bracket in the crab that is nearest to the smaller of the two tower bases. This length of Cord is then taken round the Pulley on Rod 59, is threaded between the 1½ in. Strips in the crab, is passed round one of the outside Pulleys on Rod 58, is brought down and is passed round the corresponding end Pulley 61. It is then taken one and a half turns around Pulley 48, is brought back and passed over centre Pulley 61, is taken up and around the centre Pulley on Rod 58 and is finally attached to the other Double Bracket in the crab by a 2½ in. Driving Band.

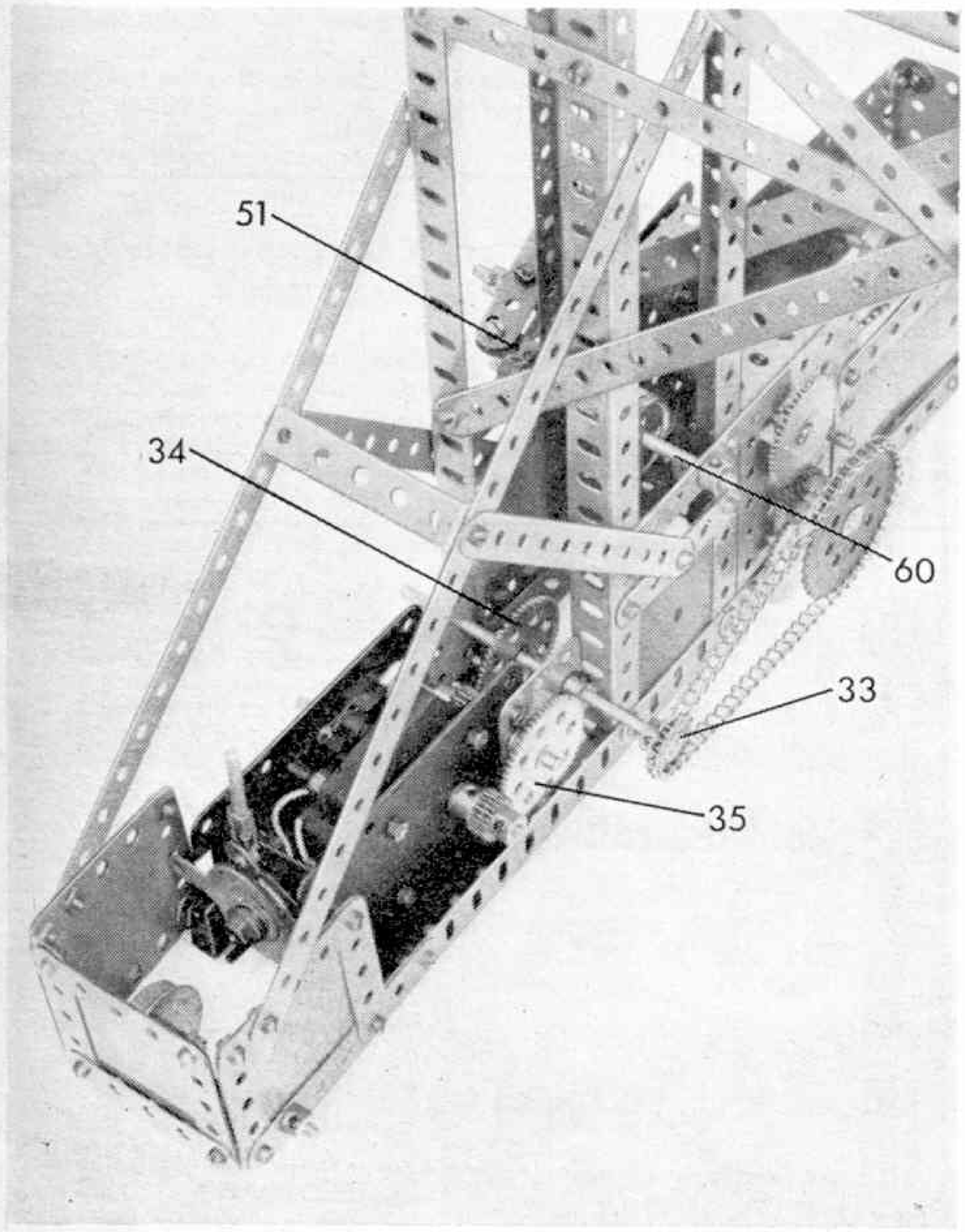
Another length of Cord is tied to the Cord Anchoring Spring on Rod 42, and is wrapped a good many times around the Rod to obtain plenty of 'spare'. It is then taken around unused Pulley 61, is brought up and around the unused Pulley on Rod 58, is passed around the first ½ in. Pulley in the crab, is taken round the 1 in. Pulley 56 in the hook, is passed over the other ½ in. Pulley in the crab and is finally tied to Strip 28.

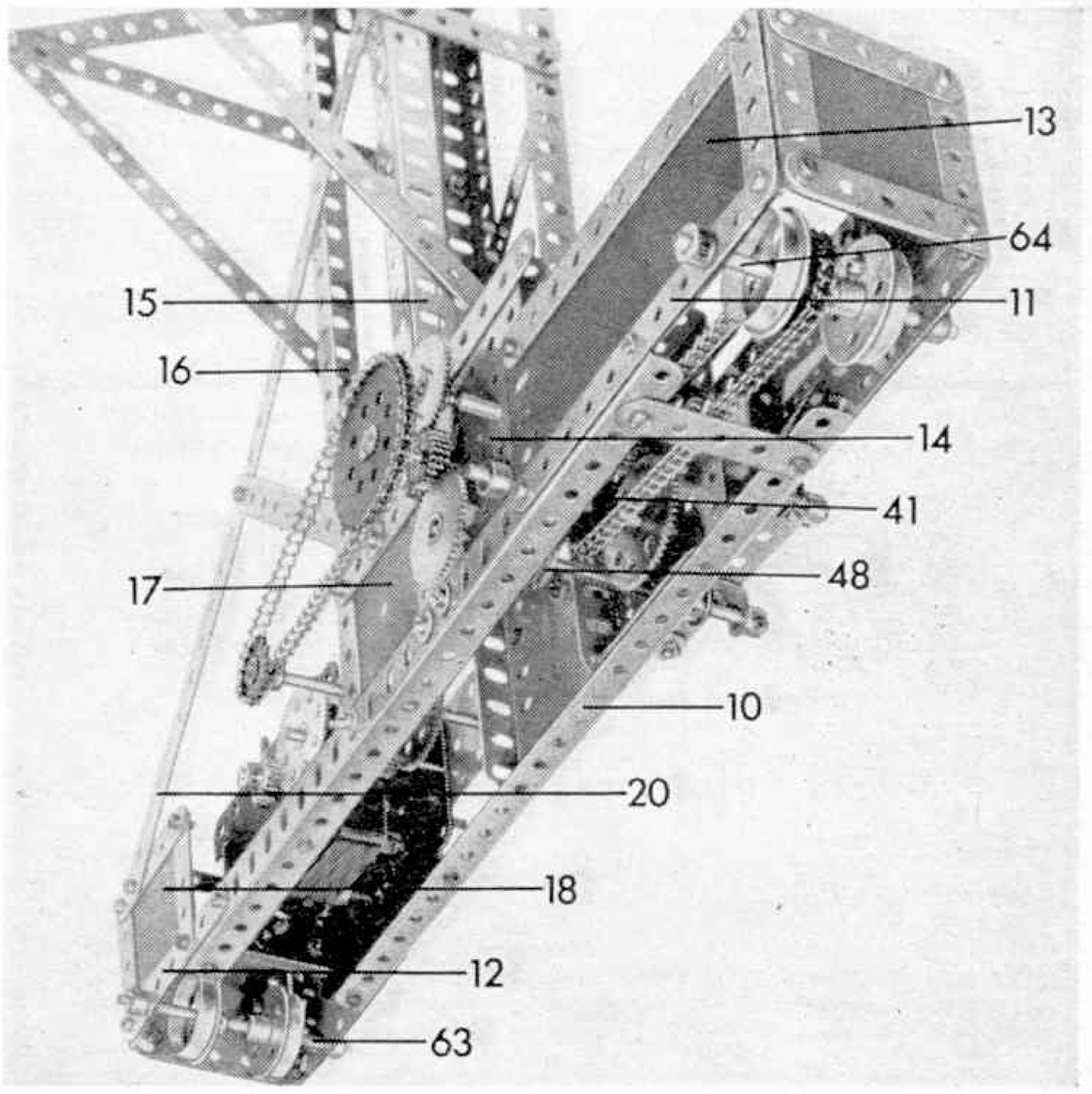
All that now remains to be fitted are the main wheels in the tower bases. Each tower has four wheels, all provided by 1¼ in. Flanged Wheels. In the smaller tower the wheels are mounted in pairs on two 3½ in. Rods 62, held by Collars in the 9½ in. Angle Girders of the base. In the larger tower the wheels are also mounted in pairs on 3½ in. Rods 63 and 64, but Rod 64 carries in addition, a 1 in. Sprocket Wheel between the Flanged Wheels. This Sprocket Wheel is connected to Sprocket Wheel 41 by a length of Sprocket Chain.

Parts required

12 of No. 1	2 of No. 7	2 of No. 15a
2 of No. 1a	10 of No. 8	18 of No. 16
18 of No. 2	2 of No. 8a	1 of No. 16b
8 of No. 3	5 of No. 11	2 of No. 17
3 of No. 4	16 of No. 12	1 of No. 18a
33 of No. 5	3 of No. 12a	8 of No. 20
4 of No. 6a	2 of No. 15	4 of No. 20b
4 of No. 22a	2 of No. 48a	2 of No. 96
6 of No. 23	2 of No. 53	1 of No. 96a
1 of No. 23a	1 of No. 57c	1 of No. 111c
1 of No. 25	32 of No. 59	3 of No. 115
4 of No. 26	1 of No. 72	1 of No. 176
2 of No. 27	2 of No. 74	8 of No. 190
4 of No. 27a	2 of No. 76	2 of No. 192
170 of No. 37a	2 of No. 90a	2 of No. 196
155 of No. 37b	1 of No. 94	1 of No. 212
30 of No. 38	1 of No. 95	1 E15R Motor







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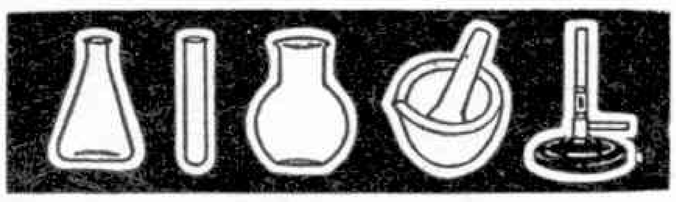

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STAMPS NEWS BY F. E. METCALFE

Our Programme

By the time these lines appear in print, the first new British stamps for 1967 will have appeared in the form of a couple of values (9d. and 1s. 6d., both with and without phosphor lines) to mark the achievement of free trade with E.F.T.A. As some will remember the Postmaster General in giving advance information regarding special stamps issued during this year, mentioned that during 1966 we had probably issued too many stamps, and that eminent philatelists had agreed with that view. He did not say who those eminent philatelists were; the fact that they were only representing themselves and not the public in general is proved by the increased interest shown as each new set was issued. That, however, is by the way, and for those who missed the official announcement, here are details of the stamps to be released this year. April 24th, four 4d. stamps (in block form), one each, 9d. and 1s. 9d. All the designs depicting British flora. July 10th, one each of 4d., 9d. and 1s. 6d., depicting British paintings (one of these will be devoted to a modern British artist, and that will perhaps cause some heartburnings, as did the design of the Technology 4d.). September 19th, one each of 4d., 1s. and 1s. 6d., depicting British discoveries, whatever they may be. And, finally (apart from the 4d. value of the forthcoming definitive issue) November 27, Christmas stamps of 3d., 4d. and 1s. 6d. values. All stamps will also have the usual phosphor lines. Quite a nice thematic programme.

Albums

With each country releasing so many new stamps, to get anywhere at all it is quite out of the question to try and form a general collection worth consideration. This being the case, collectors have to limit their activities to one or two countries and, for this reason, many albums will be produced which are devoted to the issues of a single country. Naturally, volumes devoted exclusively to British stamps are most in evidence, and there are several such albums on the market. But there is one firm publishing 'Collecta' albums which has already produced a British album and one for Maltese stamps, and will continue to publish albums devoted exclusively to the postal issues of other countries; a fine job they seem to be making of it, too. No doubt your dealer will be only too pleased to show you these volumes.

Canadian Programme

The stamps of this great sister country could not be more popular with Commonwealth collectors, so the stamp-issuing programme for this year is worth quoting, particularly as there has been a change since it was first given some weeks back. Here is the revised schedule. The January 11th Centennial stamp has already been issued, and this 5c. stamp (all are of that value except the Christmas stamps which also have a 3c. as well as the usual 5c.) will be followed by April 28th, Exposition 1967 (World Fair); May 24th, 50th Ann. Women's Franchise; June 30th, Royal Visit (all will want that one, if the design is as fine as the 1964 stamp); July 19th, Pan-American Games; August 31st, 50th Ann. Canadian Press; September 20th, Toronto Centennial as Ontario capital; October 11th, Christmas stamps. Christmas, apparently, starts early in Canada. These two stamps will, like our own special issues, also have phosphor lines (tagged as the Canadians call them) as well as the non-phosphor. Thus by the end of the year, Canadian collections are going to look nicer than ever.

New Hebrides

The Crown Agents issue leaflets and brochures giving details of stamps they release for the many countries which they represent, and one of the best of these gives details and illustrations of all the current stamps which New Hebrides has on sale. As both France and Britain share in the government of this far distant isle, half of these colourful stamps are printed in England and the rest in France, and what a fine lot they are. This Crown Agents brochure gives full details of what the stamps represent, and it is really an outstanding bit of publicity for an outstanding issue. The stamp to complete the set appeared January 24th. I wish there was room to detail all the stamps, or illustrate them.

Cayman Jet Services

On December 17th, Grand Cayman Is. issued a pair of stamps to mark the inauguration of its first jet service. The plane in question is a B.A.C. One-Eleven, with the usual two rear-mounted Rolls-Royce Spey turbofan engines, giving it a cruising speed of 550 m.p.h., and a capacity for 79 passengers. Quite a contrast to the yacht pictured below the plane on the stamp. Incidentally, the airline concerned is that of Costa Rica (LACSA).

The Tip of the Month

On May 1st the Turks and Caicos Islands will issue a set of three stamps to commemorate their first postage stamps. This will be a very popular issue because stamps depicted on stamps are very popular with thematic or, as our American friends call them, topical collectors. For this reason I am picking out this particular set for this month's tip, and would suggest that if you are thinking of forming a thematic collection then you could do much worse than going in for these stamps on stamps. You will find plenty of stamps for your collection and, in the main, they are not expensive. Mint are the most popular, as it is the designs which will interest you.

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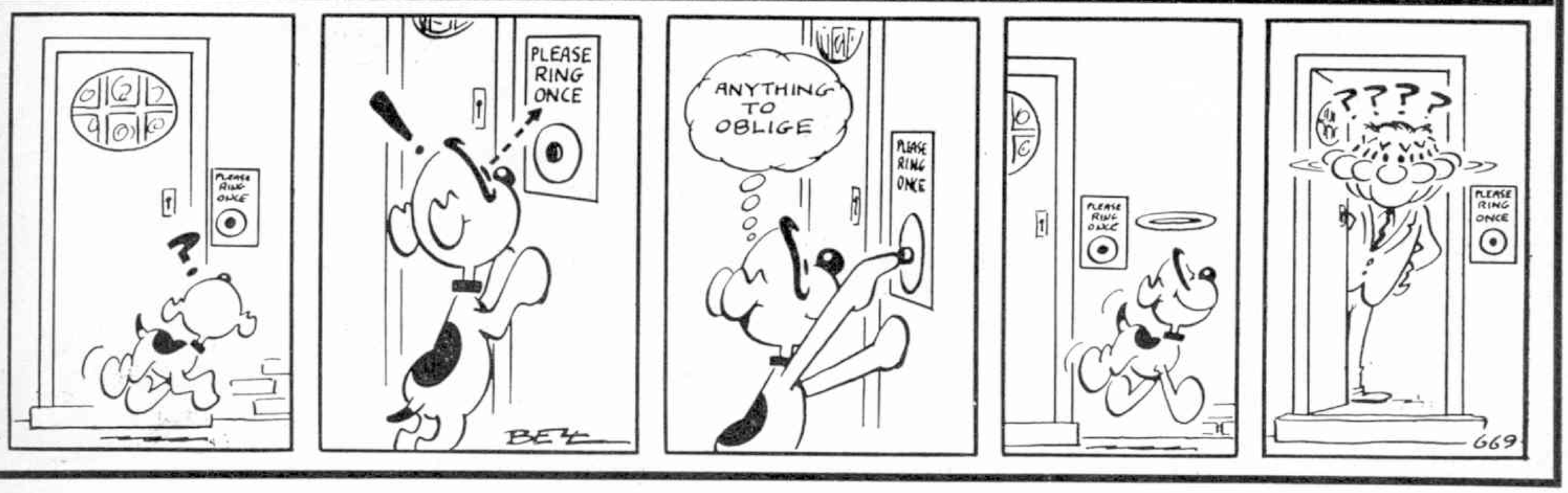

Your Queries Answered

SEVERAL correspondents have recently written to enquire about the availability of three products that are regularly mentioned in our plastic kit building articles. These are Kleintex invisible thread, Plastikard and Mek Pak liquid adhesive. Some have had difficulty in obtaining them locally and others have written to ask 'what they are'!

Kleintex invisible thread is a nylon monofilament thread which is manufactured in various thicknesses for the garments industry. It comes in two forms—natural and brown—and is only available through dress shops in one weight, sold on ordinary looking cotton reels. The product is ideal for simulating model rigging, being smooth, non-furry and possessing a slight 'stretch' which keeps the rigging taut under all conditions. Kleintex invisible thread can be tied in the normal way to anchorage points on the model. Any milliner can obtain this product if it is not already stocked.

Plastikard is a polystyrene sheet material. It comes in various thicknesses from 10 thousandths of an inch up to 40, and in either white or black. It can be obtained from most good model shops or it may be ordered by post from Beatties of London, 112 High Holborn, London, W.C.1.

Mek Pak is made by the manufacturers of Plastikard (Messrs. G. Slater) and is extremely useful for assembling small plastic components. It is a colourless liquid and is applied with a fine brush while the parts to be joined are held together.

Speak Up

Q. *I am building an electronic organ as described by you in M.M. (July to October* 1966) *but have been unable to get a loudspeaker—*80 *ohm. permanent magnet type* (2 *or* 3 *inches diameter). Would you please tell me where I could get one? The dealers here say the highest they can get is* 30 *ohm.*—J. KAY, Spennymoor, Co. Durham.

A. The 80 ohm. loudspeaker is a standard type and should be available from any good radio suppliers. Try Henry's Radio, 303 Edgware Road, London, W.2, who run a good mail order service. Price should be about 12s. 6d. to 15s.

Positively Correct

Q. *With reference to the Pops and Flashes article (May* 1966 *issue) in which you described the construction of an Electronic Metronome, there is no indication of the collector and emitter connections on TR2 OC72. However, if one looks at TR3 and the multi-vibrator circuit one can assume it is the emitter that goes to positive. I feel I should point this out.*—L. NEWELL, Woodbridge, Suffolk.

A You are correct in assuming that the emitter of TR3 goes to the positive line. Unfortunately the arrowhead on this transistor got left out in the drawing of the circuit. Incidentally, for best results you should try to obtain a matched pair of OC72 transistors for the multivibrator circuit.

The Lost Chord

Q. *I have built the electronic organ described in your issues last year and have just completed the 'tremulo' unit described in the October issue. I find that this will only oscillate for a short period before stabilizing and thenceforth only altering the pitch of the note. The unit has been taken apart and the value of every component measured and reassembled, all with the same results. By increasing the supply voltage to about* 14 *V a slightly longer time before stabilization can be achieved. I wonder if you can advise me on how to make the unit work, as it baffles me as well as the electronic experts where I work?*—M. J. COTTON, Hounslow.

A. I am just as puzzled as you at the symptoms you describe regarding the performance of the 'tremulo' circuit on your electronic organ. The cause will lie in the main organ circuit, not the tremulo, which is providing damping, possibly, through accidental inductance. I would suspect the performance of the two transistors in the main circuit first; but before removing these to check or replace, see that their *leads* are as far as possible from each other and other components. Alternatively, see if you can cure the trouble by inserting a variable resistor in the tremulo input lead to the main organ circuit.

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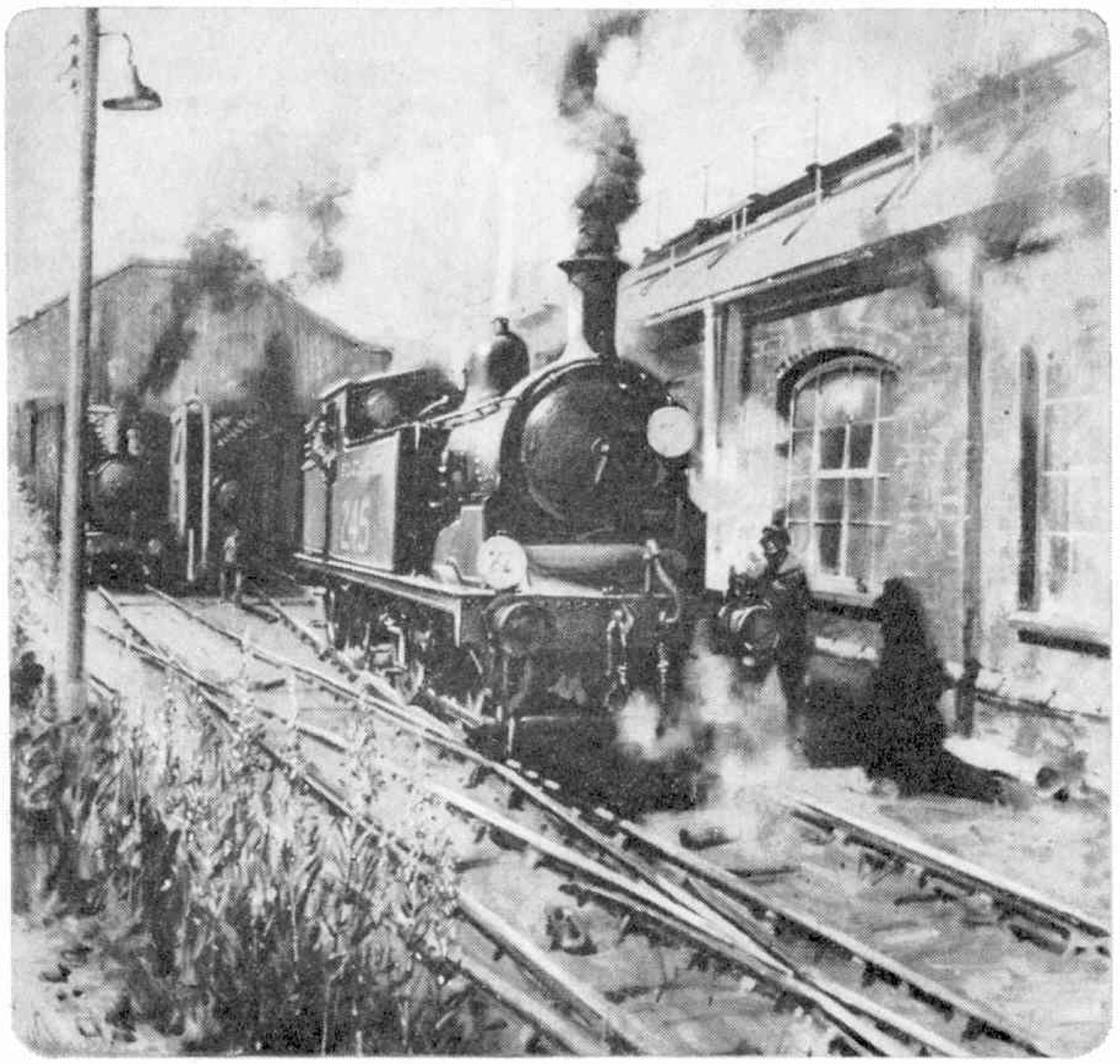

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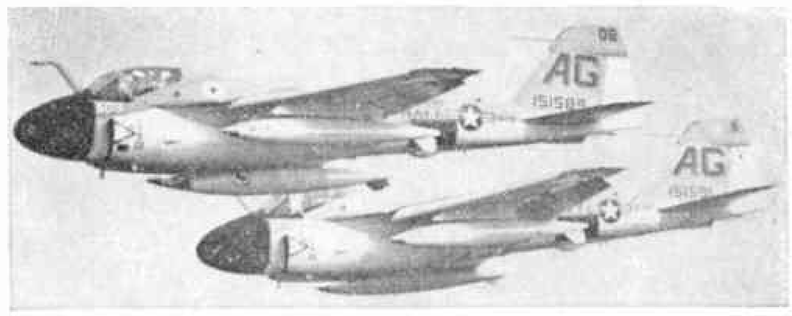

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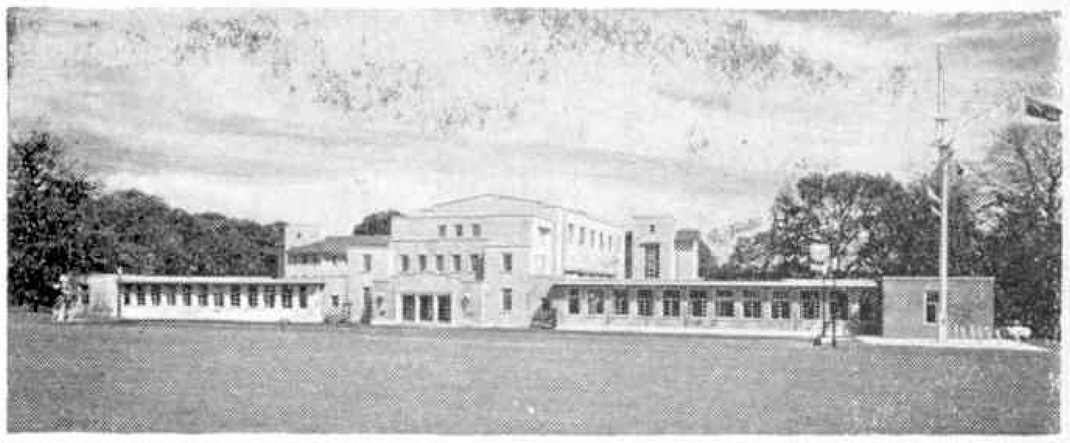

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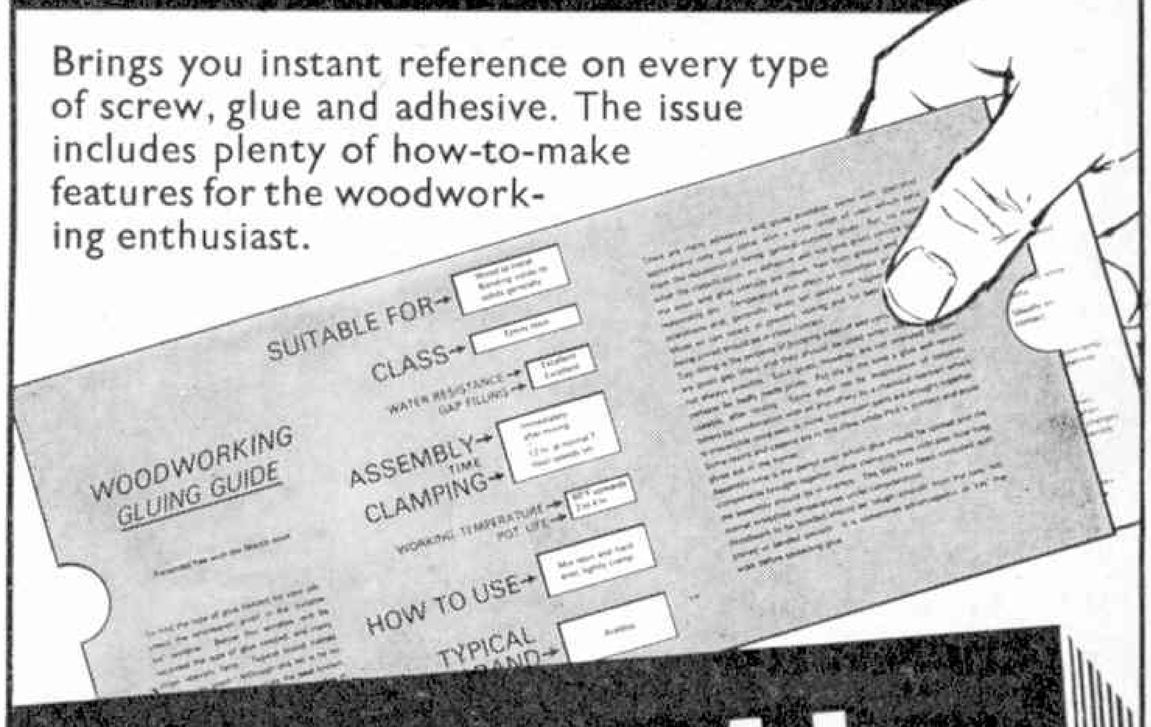

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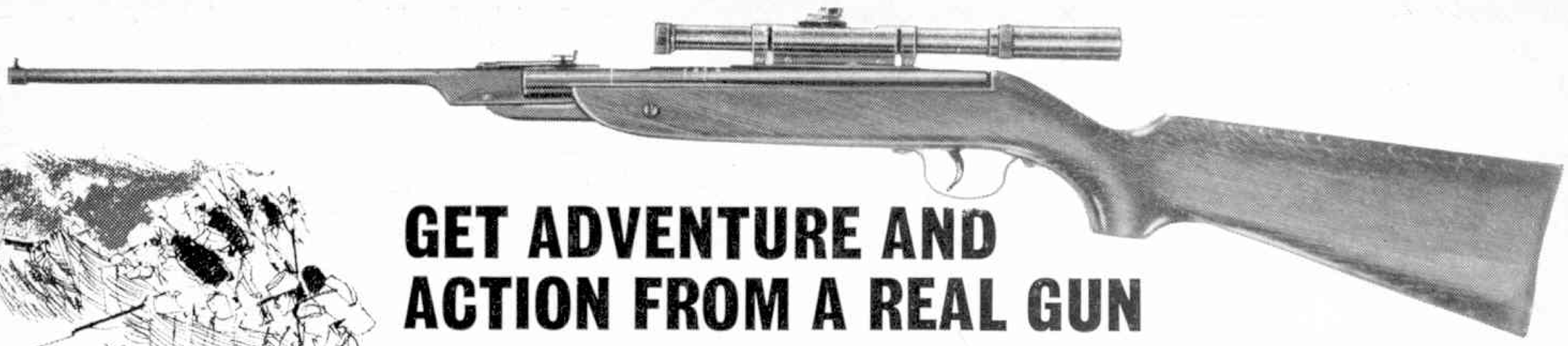

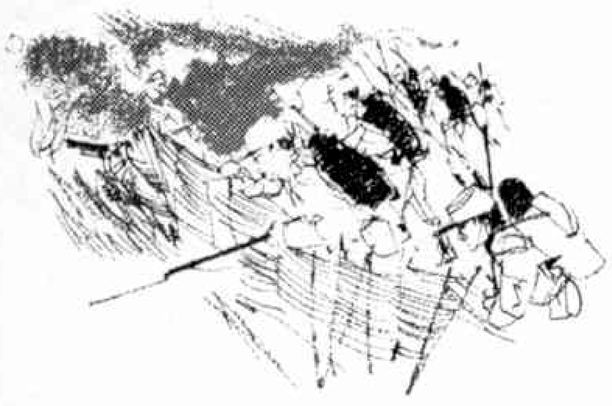

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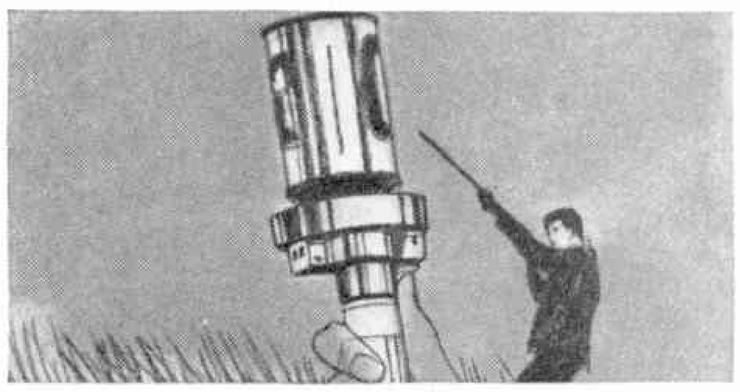

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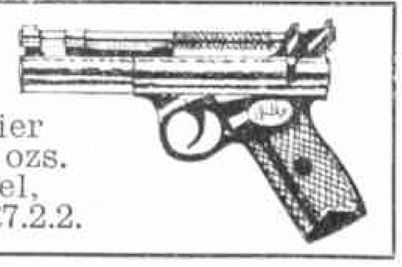

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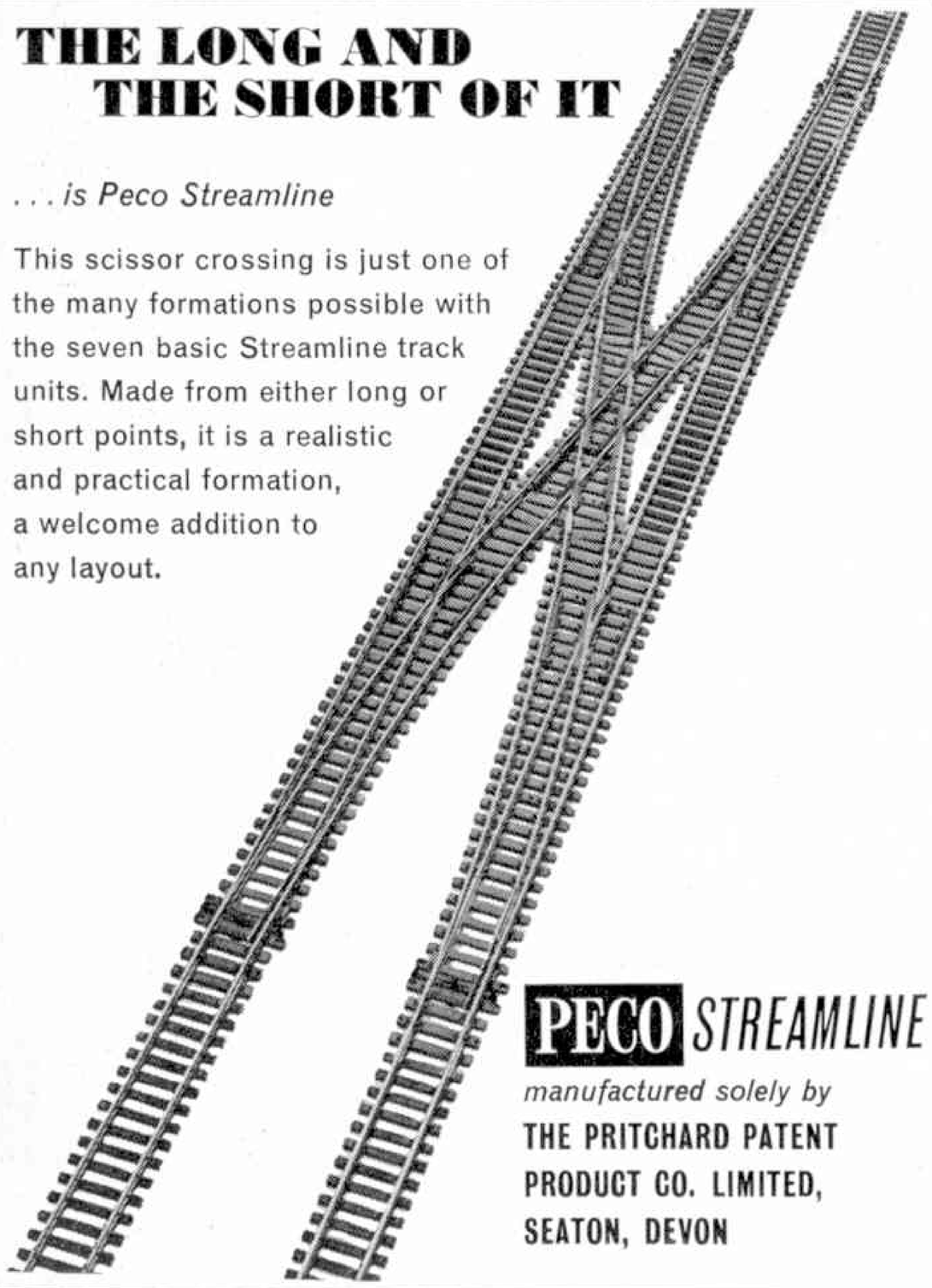

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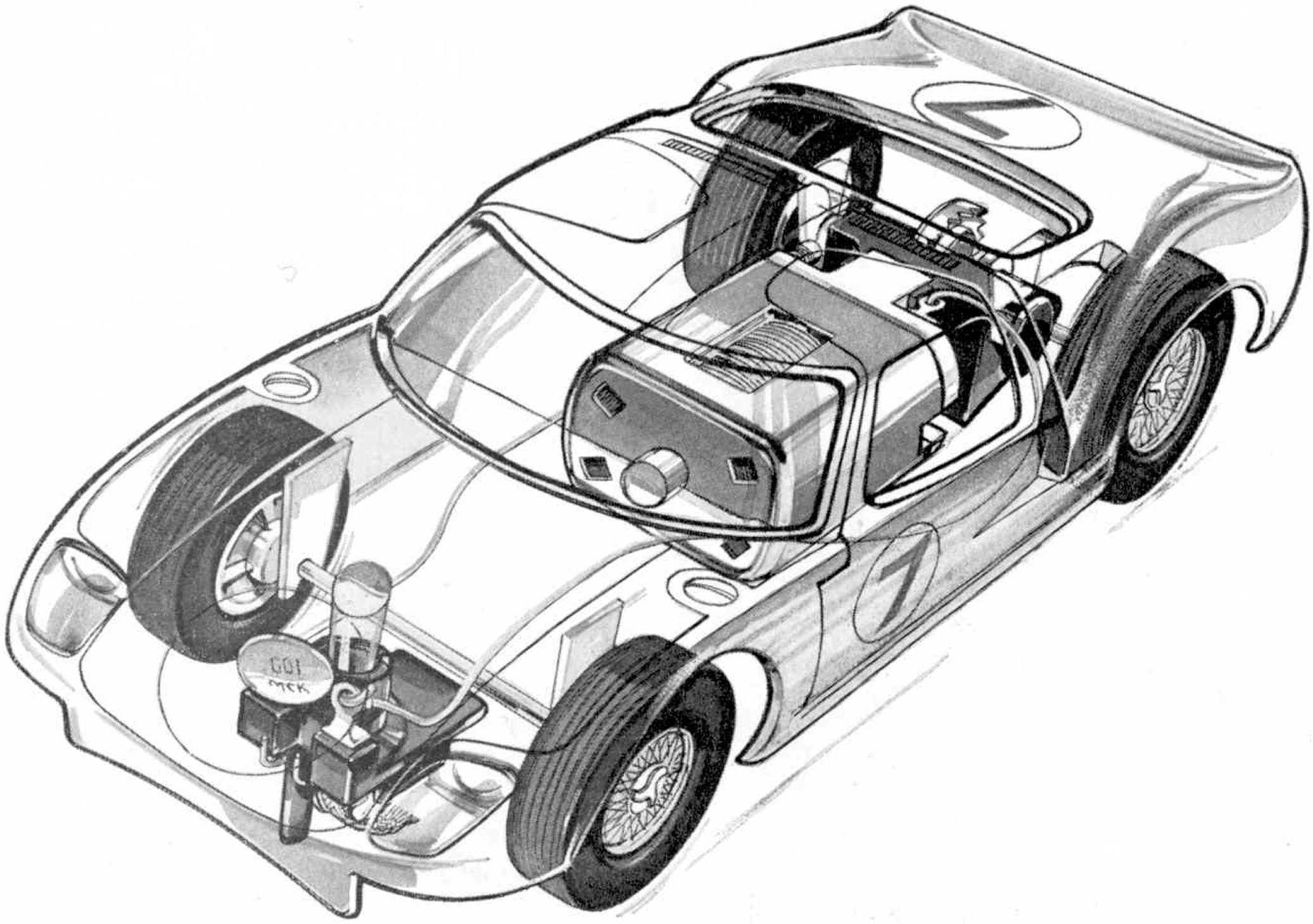

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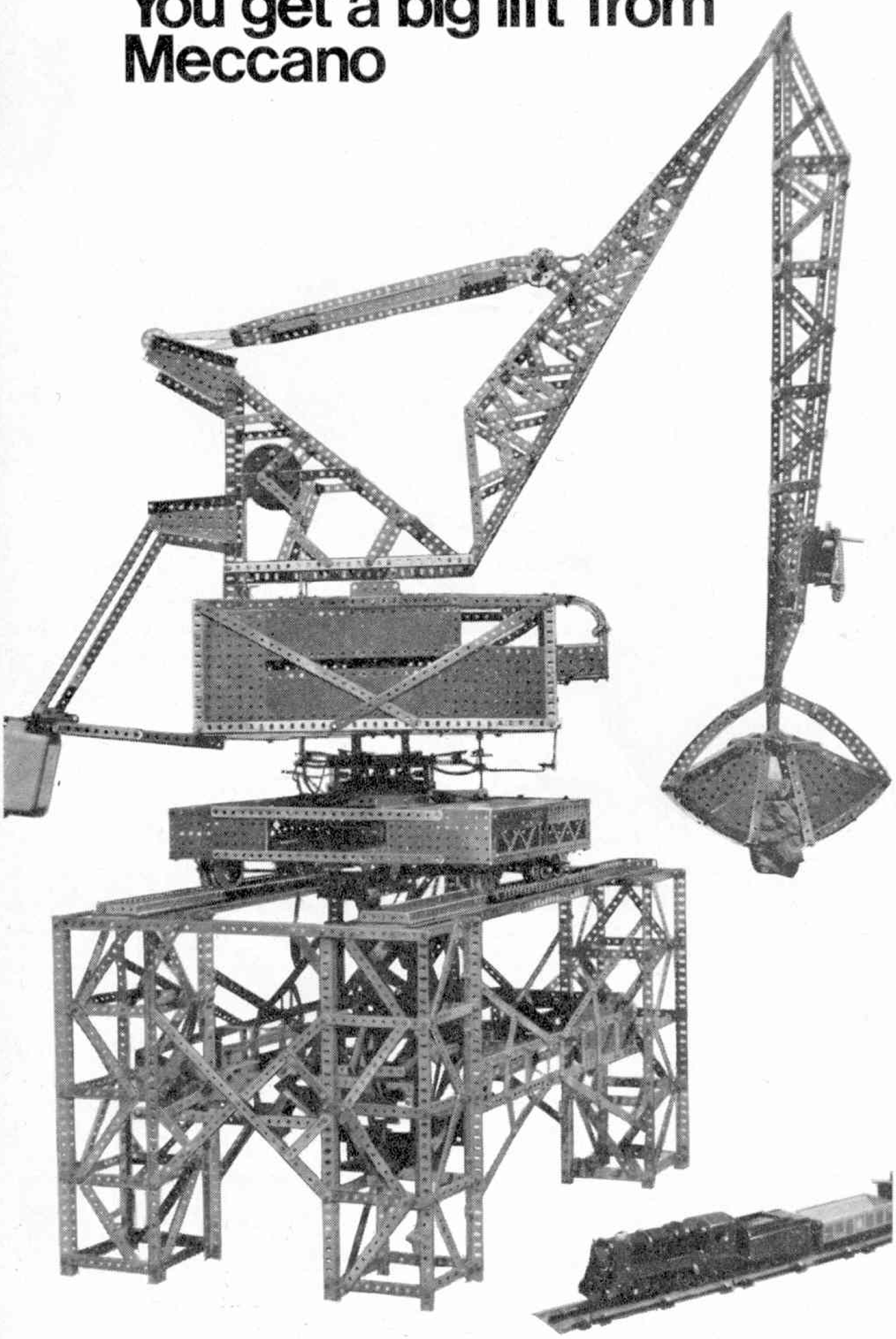

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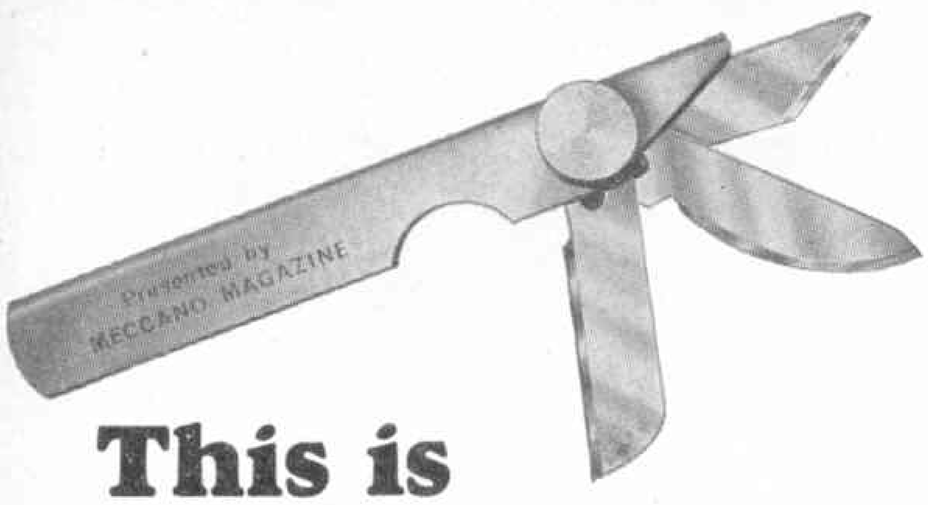

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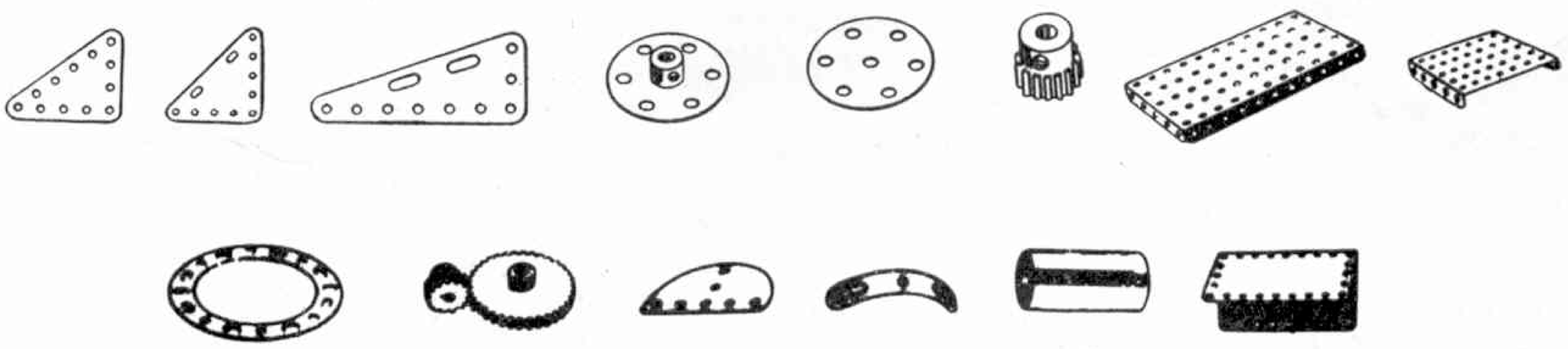

Dealers who specialise in Meccano spare parts

Listed below are some of the dealers who sell Meccano accessories and spare parts. This is intended to aid enthusiasts—and there are many of them—who constantly require additional spare parts for their Sets. All dealers can, of course, order Meccano spare parts for their customers, but those listed here are among our spare part specialists.

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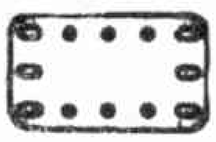

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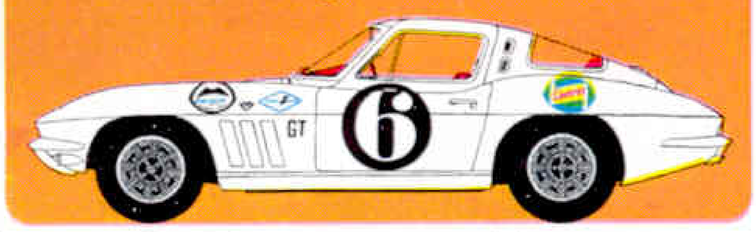

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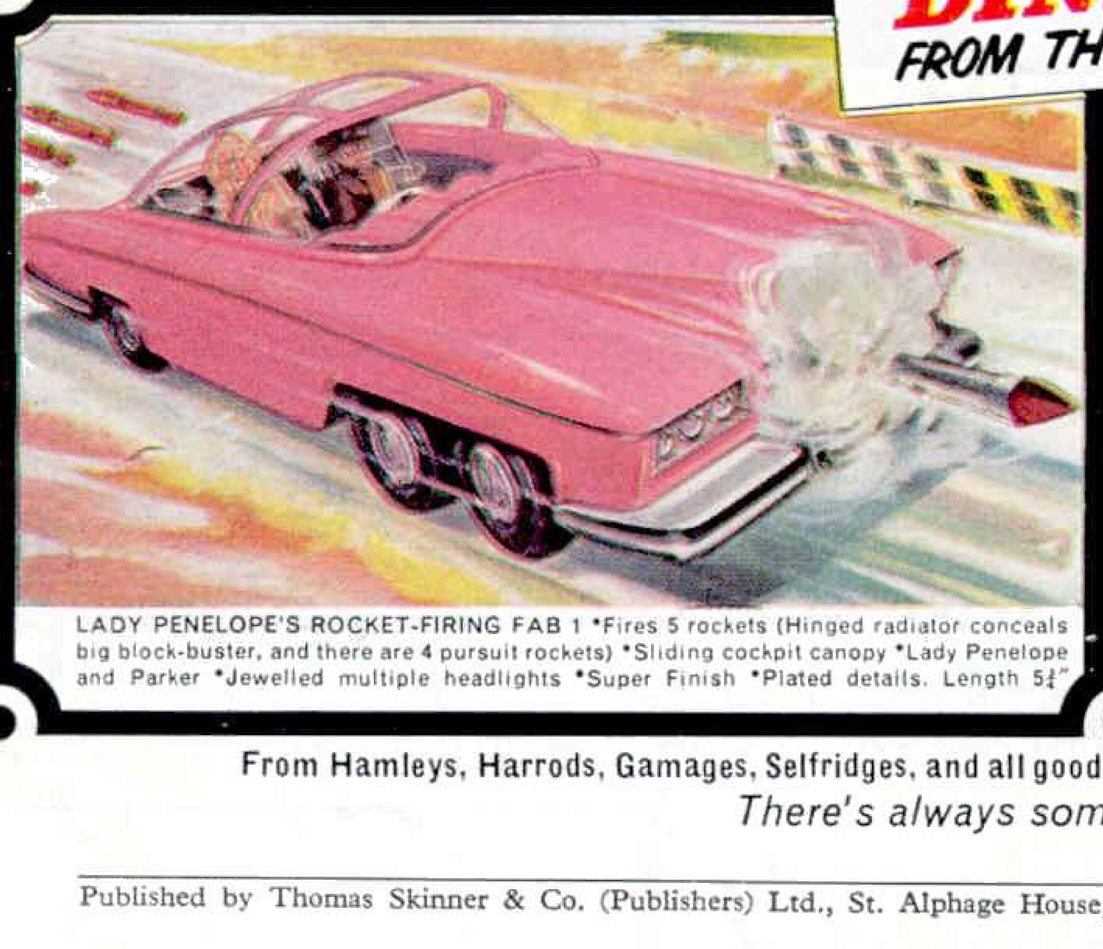

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